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IMPLEMENTATION OF ELECTRONIC FUNDS TRANSFER (EFT)/FINANCIAL ELECTRONIC DATA INTERCHANGE (FEDI) IN THE DEPARTMENT OF DEFENSE: LESSONS LEARNED FROM PRIVATE INDUSTRY

by

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Acquisition reform has taken center stage within the Department of Defense (DoD) contracting system. A major cornerstone of acquisition reform is the use of technology to streamline and facilitate the procurement process. One primary initiative is the application of information technologies such as Electronic Commerce (EC)/Electronic Data Interchange (EDI).

One area where EC/EDI technology is being applied is to the DoD electronic payment process through the implementation of EFT/FEDI. This application of information technology to the payment process has provided for a secure, rapid, and cost effective means for issuing payments to DoD contractors. However, the processes involved before and after the electronic payment itself are still causing inaccuracies in contractor payments.

The focus of this research was to provide lessons learned on how private industry has implemented EFT/FEDI to improve the accuracy of contractor payments. The results of this research show that private industry 1) develops an EC/EDI Strategic Plan; 2) emphasizes senior management consensus and communication; 3) re-engineers the payment process; 4) carefully selects a financial service provider; 5) applies information technology; and 6) communicates with the vendor base.

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IMPLEMENTATION OF ELECTRONIC FUNDS TRANSFER (EFT)/ FINANCIAL ELECTRONIC DATA INTERCHANGE (FEDI) IN THE DEPARTMENT OF DEFENSE: LESSONS LEARNED FROM PRIVATE INDUSTRY

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ABSTRACT

Acquisition reform has taken center stage within the Department of Defense (DoD) contracting system. A major cornerstone of acquisition reform is the use of technology to streamline and facilitate the procurement process. One primary initiative is the application of information technologies such as Electronic Commerce (EC)/Electronic Data Interchange (EDI).

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I. INTRODUCTION

A. GENERAL

Acquisition reform has taken center stage within the Department of Defense (DoD) contracting system. A major cornerstone of acquisition reform is the use of technology to streamline and facilitate the procurement process. One primary initiative is the application of information technologies such as Electronic Commerce (EC)/Electronic Data Interchange (EDI).

EC has been defined as "the conduct of administration, finance, logistics, procurement, and transportation between the Government and private industry using an integrated automated information environment to exchange business transactions." [Ref. 1:p. 16] However, many consider this definition as limiting because it implies that EC is only conducted between the Government and private industry. A more general definition can be found in the DoD Electronic Commerce Information Center's (ECIC) Handbook for Business which defines EC as "the paperless exchange of business information using Electronic Data Interchange (EDI), Electronic Mail (E-Mail), computer bulletin boards, FAX, Electronic Funds Transfer (EFT), and other similar technologies." [Ref. 2:p. 1] "Electronic Data Interchange (EDI) is the computer-to-computer exchange of business information using a public standard." [Ref. 2:p. 1]

To facilitate a clear understanding of EC/EDI it is important to note the relationship between EC and EDI as well as the differences. As noted in the ECIC Handbook, "EDI is a central part of Electronic Commerce, because it enables businesses to exchange business information electronically much faster, and more cheaply and accurately than is possible using paper based systems." [Ref. 2:p. 1] It is critical to note that EC transactions usually require some sort of human intervention to complete the transaction. However, in a true EDI transaction, the transaction is computer-to-computer without human intervention. "It is through the use of EDI, that commercial businesses and the Government can replace the time-consuming and repetitive process of manually handling large volumes of standard business documents with an instantaneous, single-entry exchange of digital information between computers." [Ref. 3:p. 2]

Along this line, many companies of all shapes and sizes are exploring the many advantages of electronic funds transfer (EFT) and financial electronic data interchange (FEDI). EFT is the bank-to-bank exchange of electronic payment instructions while FEDI is the exchange of electronic business information between a firm and its bank or other financial intermediary. [Ref. 4:p. 1] It should be noted that these definitions are not universally accepted. EFT has also been defined as the movement of data from firm to banking system to firm while FEDI has been defined as any transaction that is

associated with payment, such as invoice, remittance advice, and credit/debit memo. [Ref. 5:p. 13] It is the second set of definitions that will be used by the author in this thesis. Private industry currently uses EFT/FEDI for the electronic payment of invoices. Private industry is using EFT/FEDI for good reason: "EFT/FEDI helps cement relationships between trading partners, enhances the cash management function and contributes to the reengineering efforts under way in many organizations by promoting greater efficiency and tangible savings." [Ref. 6:p. 10]

DoD is likewise using EFT/FEDI with its trading partners. However, some companies in private industry have been more aggressive and successful in implementing and using EFT/FEDI. This use of EFT/FEDI for payment processing has allowed these pioneers to keep absolute control of payment timing, improve relationships with suppliers, and reduce total processing costs. As DoD goes through the EFT/FEDI implementation and policy process, there are several potential impediments or areas of concern that must be addressed in order to provide for a smooth implementation. This thesis will attempt to address some of those areas and to provide lessons learned from the private sector.

B. OBJECTIVE OF THE RESEARCH

This thesis will analyze the issues encountered by DoD in its ongoing efforts to implement EFT/FEDI in their contracting system. The purpose of this research is to determine how

EFT/FEDI is used in private industry and how that information can be used to enhance DoD's EC implementation strategy. The research will focus on the EFT/FEDI implementation and operational problems encountered by private industry. Specifically, the research will focus on how these impediments were overcome and how DoD can benefit from these lessons learned.

C. RESEARCH QUESTION

The primary research question is: How is EFT/FEDI used in private industry and how can that information be used to facilitate a successful implementation of EFT/FEDI in the DoD contracting system?

The following subsidiary research questions are deemed pertinent to this research effort:

1. What is EFT/FEDI?
2. What is the current status of EFT/FEDI technology within the private sector acquisition and contracting system?
3. What is the current status of EFT/FEDI technology within the DoD acquisition and contracting system?
4. What problems have the private sector encountered during the implementation and operation of EFT/FEDI and how have these problems been resolved?
5. Can private sector EFT/FEDI applications be utilized effectively and efficiently in DoD acquisition?
6. What concerns regarding EFT/FEDI implementation exist at the Defense Finance and Accounting Service (DFAS) Center and with DoD contractors?
7. What strategic issues must be resolved to achieve a successful implementation of EFT/FEDI in DoD's contracting system?

D. METHODOLOGY

The methodology involved in this research consists of three segments: (1) development of a literature base, (2) telephone and personal interviews with DoD leadership and private industry representatives, and (3) participation in EC/EDI educational seminars.

An extensive review of current literature was performed using computer data base searches including: (1) Defense Logistics Studies Information Exchange, (2) Defense Technical Information Center, (3) computer data bases available at the Dudley Knox Library, and (4) an ongoing search of the INTERNET.

The personal and/or electronic (telephone, facsimile, electronic mail) interviews with appropriate DFAS and Defense Logistics Agency (DLA) personnel, DoD contractors and wholly commercial industry representatives will establish the current level of EFT/FEDI use in DoD and the private sector. Additionally, the interviews will aid the researcher in creating work flow diagrams to be used in analyzing the extent to which contractor payments are manual and/or automated.

E. LIMITATIONS AND ASSUMPTIONS

1. Limitations

The basis of this thesis is to examine the capabilities of EFT/FEDI and then to match these capabilities to potential opportunities within the DoD contracting system. The underlying purpose of the research is to promote the

advancement of EC in DoD. This thesis will concentrate on how private industry implemented EFT/FEDI, and how they have overcome impediments involved with its implementation. This thesis does not include an extensive discussion of the actual programming of EDI bridging, translation, and management software or a technical discussion of the computer and communications hardware required to implement EFT/FEDI or ANSI X-12 standards. However, these issues will be discussed as needed to convey how they were addressed by private industry.

2. Assumptions

The reader is assumed to have a basic knowledge of the DoD acquisition and contracting system. Even though the introductory chapters provide a discussion of EC/EDI and EFT/FEDI, the reader is assumed to be familiar with the basic tenets of EC/EDI and the Federal Acquisition Regulation (FAR). This researcher recommends that a reader who is not familiar with the basics of the DoD acquisition and contracting system refer elsewhere for a more complete explanation of the theory, principles, and regulatory basis underlying DoD acquisition and contracting.

F. ORGANIZATION OF THE THESIS

This thesis is organized into five chapters. The first chapter is an introduction to the thesis. Chapter II highlights EC/EDI background and development as well as EFT/FEDI background and development, and its current use in private industry. Chapter III is an analysis of the current

status of EFT/FEDI in DoD contracting based on research and results of personal interviews. Chapter IV presents and discusses the applicability of private sector lessons learned to DoD implementation of EFT/FEDI. Chapter V presents the researcher's final recommendations and conclusions.

II. BACKGROUND

A. INTRODUCTION

Use of EC/EDI to support DoD procurement processes has been under consideration for some time. [Ref. 1:p. I] This desire to take advantage of advanced information technologies stems from the expected benefits of EC/EDI implementation. Using EC/EDI to reform the acquisition process benefits both the Government and its suppliers. Benefits for the Government include the following:

- Lower prices
- Increased competition
- Increased buyer productivity
- Better management information
- Reduced acquisition times and costs
- Better inventory control

Supplier benefits are:

- Improved profitability and cash flow
- Increased opportunity to participate in Government acquisition
- Increased operating efficiencies
- Improved payment process [Ref. 7:p. vii]

These combined benefits should result in lower costs and greater efficiency for both the Government and its suppliers.

The main impetus to automate the DoD contracting system, however, comes from the continued reduction in operating budgets and reduced staffs. Moving the DoD contracting system from a manual or automated system to one using information technology should be beneficial in meeting future budgetary and personnel reductions.

As noted in the ECIC handbook, "The government did not invent EC/EDI; it is merely taking advantage of an established technology that has been used in the private sector for the last few decades." [Ref. 2:p. 2] The purpose of this chapter is to introduce the reader to the direction the Federal Government is taking on EC/EDI. Additionally, this chapter will delineate the history of EDI and explain some of the key concepts associated with EDI. Last, this chapter will provide an introduction to EFT/FEDI along with its current use in industry.

B. FEDERAL GOVERNMENT DIRECTION ON EC/EDI

In May 1988, a Deputy Secretary of Defense memo called for the maximum use of EDI based on ten years of DoD EDI investigation and experiments. [Ref. 1:p. I] The memo further directed that DoD join the private sector as a full trading partner in EDI and make EDI "the way of doing business." [Ref. 8:p. 1] Additionally, the memorandum mandated that DoD use ANSI X12 standards for conducting EDI transactions.

In May 1990, the Deputy Secretary of Defense for Production and Logistics designated the Defense Logistics

Agency (DLA) as the DoD Executive Agent for Electronic Data Interchange. This designation was significant as evidenced by the following list of responsibilities assigned to the Executive Agent:

1. Ensure compliance with policies and standards.
2. Provide standard implementation guidelines and established support agreements.
3. Establish and control standard support components for use throughout DoD.
4. Provide common user systems, facilities, and services where appropriate.
5. Ensure a "single face to industry." [Ref. 9:p.1-4]

In 1990, the Defense Management Review Decision (DMRD) 941 entitled *Implementation of Electronic Data Interchange in DoD*, stated that: "The strategic goal of DoD's current efforts is to provide the department with the capability to initiate, conduct, and maintain its external business related transactions and internal logistics, contracting, and financial activities without requiring the use of hard copy media." [Ref 1:p. I] In order to encourage this move from hard copy media, the intention of DMRD 941 was "...to accelerate the use of EDI by DoD through the programming of cost reductions into the budgets of each military department and DLA." [Ref. 10:p. 8] These cost reductions were based on the estimated savings associated with EDI transaction use. It should be noted that "the budget reductions will occur regardless of actual savings realized." [Ref. 10:p. 8]

In January 1993, the DoD Acquisition Law Advisory Panel submitted a report to Congress that concentrated on "changes that would streamline the defense procurement process in the 1990's, when dollars are expected to be fewer, work forces smaller, and superpower security threats less urgent." [Ref. 1:p. i]

> Among the hundreds of recommendations contained in the report were several that addressed the increased use of electronic procurement notice and contracting methods. The rapid implementation of EC in the DoD directly supports acquisition reform.... EC contains the inherent capability to provide adequate electronic notices and will enhance access to DoD procurement information for small businesses and is a vast improvement over the manual system that is currently in use. Therefore, EC and the associated DoD EDI architecture are vital to the reform program and congressional support of many other acquisition reform initiatives. [Ref. 1:p. i]

This line of thinking was echoed later in 1993 by yet another analysis of how Government should work better. In September 1993, The National Performance Review (NPR), which was headed by Vice President Gore, released its findings and recommendations. The NPR found that Federal procurement was among one of three major areas ripe for reform. Among the many recommendations to improve Federal Government procurement contained in the NPR was the recommendation to establish a Government-wide program using EC for Federal procurements. [Ref. 11:p. 5]

"The federal government's shift into the information age was launched with some urgency on October 26, 1993, when

President Clinton released a memorandum directing the government to move quickly to implement EC." [Ref. 12:p. 1] The memorandum introduced an ambitious schedule to establish "complete government-wide implementation of EC for appropriate federal purchases to the maximum extent possible" by January 1997. The milestones for EDI implementation were designated in the October 1993 Presidential Memorandum as follows:

> *March 1994*: Define the architecture for a government-wide electronic commerce procurement system and identify the executive departments and agencies to be responsible for developing, implementing, operating, and maintaining the federal electronic system.
>
> *September 1994*: Establish an initial electronic commerce capability by which the federal government and private firms may electronically exchange standardized quotes, requests for quotations (RFQs), purchase orders, and notices of award. Begin the government-wide implementation of this system.
>
> *July 1995*: Implement a full-scale federal electronic commerce system that expands the initial capabilities to include electronic payments, document interchange, and support databases.
>
> *January 1997*: Finalize the government-wide implementation of electronic commerce for appropriate federal purchases to the maximum extent possible. [Ref 12:p. 2]

"Even after all of this direction and guidance from within the Executive branch of the Government, development and implementation of EDI capability within the Government has proceeded slowly." [Ref 3:p. 12] However, in 1994, the Federal Acquisition Streamlining Act (FASA) was enacted and significantly aided President Clinton's challenge by

specifying the development of a Federal Acquisition Computer Network (FACNET) architecture for automating the acquisition process. Developed for the purpose of transforming a paper-driven process into a modern computer-driven system, FACNET will include the following listed components once it is fully implemented:

1. A single means of supplier registration for electronically conducting business with the federal government, including a standardized trading partner agreement defining the "rules of the road."

2. ASC X12: A standard method of implementing the EDI transaction formats used in the United States. This format has been approved by the American National Standards Institute (ANSI) Accredited Standards Committee (ASC).

3. Existing agency-mandated automated procurement systems modified to generate standard EDI ASC X12 transactions. (Agencies will either modify their existing systems to feed data to a commercial off-the-shelf (COTS) software package called a translator-that generates the X12 transaction, or acquire new, EDI-enabled automated procurement systems.)

4. A virtual network (i.e., a common point through which all information is transmitted and converted to standard data) connecting agency-standardized transactions to facilities value-added networks (VANs) or other entities access them. VANs are third-party electronic that serve as extensions of the virtual network. They provide value-added services such as translation to standard data and connections to other third-party networks, for the government, contractors, and banking institutions.

5. Access to government databases, such as wage determinations, that are integral to the government's contracting function.

6. A standard operating agreement between the government, its supporting VANs, and its trading partners.

7. A system based on the ASC X12 standards that gives agency procurement staff access to government databases of contractors.

8. The development of electronic funds transfer (EFT) architecture to support the use of EFT as the principal method for making payments to contractors. [Ref 12:p. 2-3]

In 1995, in an effort to further revise and streamline acquisition laws, the Federal Acquisition Reform Act (FARA) was enacted. [Ref 13] As can be seen through the description of FACNET above, this automated procurement system has the potential to greatly increase the volume of electronic transactions. "FARA's goal is to ensure that the benefits gained from further streamlining acquisition laws are not hindered by problems associated with the greater volume of electronic transactions that could take place." [Ref 12:p. 3] This concern was noted in testimony by Dr. Steven Kelman, Administrator for the Office of Federal Procurement Policy, at a hearing held by the Committee on Government Reform and Oversight on February 28, 1995. At that hearing, Dr. Kelman stated that:

> FACNET has the potential to promote efficiency and streamlining by substituting electronic transactions for paper ones and to increase competition by making it easier to gain access to contracting opportunities--especially in the small-dollar range. [Ref 12:p. 3]

Dr. Kelman went on to state that with vastly more bidders, the potential for misunderstandings will go up significantly. If this happens, Dr. Kelman believes that "...the simplification and productivity savings of electronic commerce can easily be lost." [Ref. 12:p. 3]

In order to ensure the productivity savings associated with EC/EDI implementation are not lost, the Government and its contractors must first understand what EDI is. Then both parties must understand how to identify business transactions that lend themselves to EDI conversion.

C. WHAT IS EDI?

In order to fully understand what EDI is, several key concepts need to be explained. First, EDI itself should be defined and differentiated from EC. Next the history and concept of EDI standards should be explained. Finally, the term "transaction sets" should be more fully described. This section will describe EDI and the concepts noted.

1. Definition

Preliminary to defining EDI, it is important to explain how EDI relates to EC. As noted in Chapter I, EDI is only one technology under the umbrella of EC. EC transactions usually require some sort of human intervention to complete the

transaction. However, in a true EDI transaction, the transaction is computer-to-computer without human intervention. This difference is critical to note because of the direction the Federal Government has taken on EC/EDI. The Government is focusing on EDI implementation, which is the more ambitious method of electronic transfers between organizations.

"In simple terms, EDI is the process of electronically transferring routine business documents in a pre-established, standard format (transaction set) from one organization's computer to another." [Ref 10:p. 9] However, in no way should EDI be thought of as a simple process. This is because for a transmission to be called EDI, the transmission must be electronic paperless, and without human intervention (e.g., no human monitoring of the transmission itself). [Ref. 14:p. 4] As the amount of these complex electronic transmissions has increased, so too has the need for EDI standards.

2. EDI Standards

EDI was first conceived by Edward A. Guilbert in the late 1940's as a way to speed up the flow of materials during the Berlin airlift. [Ref. 10:p. 6] Since the mid-1950's, computer-to-computer exchange of business information has been conducted within DoD and many large private companies. [Ref. 3:p. 7] However, since these organizations were using unique electronic formats, EDI use was limited. Thus, industry realized standards were necessary if EDI usage was to grow.

In the late 1960s and 1970s, the first standards were developed by the Transportation Data Coordinating Committee (TDCC) for the rail, motor, air, and ocean industries. [Ref 10:p. 7] Other industry standards were developed within the grocery (Uniform Grocery Standard), chemical (Chemical Industry Data Exchange), and petroleum (Petroleum Industry Data Exchange) communities. [Ref. 3:p. 8] Unfortunately, the limitations of these industry specific standards were evident, once an industry tried to cut across industry boundaries. If EDI growth was again to be stimulated, EDI standards that were applicable across industries would have to be created.

In order to develop a national EDI standard, several industry associations took their problem to the American National Standards Institute (ANSI). In 1979, ANSI chartered the Accredited Standards Committee (ASC) X12 to facilitate defining a "single, flexible, generic transaction set protocol" which would allow the exchange of electronic business information across a wide range of industry boundaries. [Ref 15:p. 2] The goal of the ASC X12 is to:

> ...structure standards so that computer programs can translate data to/from internal formats without extensive reprogramming. In this way, by using internally developed or commercially available software and private or public-access communications networks, ASC X12 believes that all sizes of firms and institutions using intelligent computational devices can benefit from use of the standard. ...a standard interchange format can greatly reduce the difficulties and expense if each institution were to impose its own formats on every other institution with which it does business. [Ref. 16:p. iii]

The standards that the ASC X12 developed are dynamic in nature and are continuously expanding to meet additional requirements. In ASC X12, various subcommittees develop new proposed standards that are then sent to the full membership for their approval.

> Those standards approved are then published as draft standards for trial use and immediately placed in maintenance status. Once each year, the Data Interchange Standards Association Inc. (DISA) publishes the entire set of standards, including revisions of previously published draft standards and new draft standards approved by ASC X12 during the year, in a publication called a release. Then at three-year intervals the latest release is reviewed for selection of appropriate draft standards for submission to ANSI to begin the national review process. Once approved by the public, the proposed standards are published as American National Standards and assigned a new version number. Although the approval process appears long and detailed, it assures only quality standards that are responsive to the needs of the users are released. [Ref. 10:p. 14]

The standards developed by ASC X12 include the documentation describing transactions sets, data segment directories, data elements dictionaries, code sets, and interchange control structure. [Ref. 3:p. 9]

Although ANSI's ASC X12 is the major EDI standard throughout the United States, there is another standard used internationally. UN/EDIFACT stands for United Nations Rules of Electronic Data Interchange for Administration, Commerce, and Transport. "UN/EDIFACT is an international standards set comprised of agreed standards, directories, and guidelines for the electronic interchange of structured data that relate to

trade in goods and services between independent, computerized information systems." [Ref. 10:p. 14] The ASC X12 standard will be aligned with EDIFACT by 1997. [Ref. 3:p. 9]

3. Transaction Sets

The ASC X12 standards define the EDI transaction set as the computerized document format used in EDI as the means of communicating standard business transactions. [Ref. 10:p. 15] This simply means that a transaction set is just an electronic equivalent of a paper document. A three digit number is used to identify a transaction set. Table 1 lists examples of some more common transactions sets and their paper document equivalents:

TABLE 1

EDI DOCUMENT CONVERSION

Transaction Set Number	Paper Document Equivalent
A. 511	Requisition
B. 810	Invoice
C. 820	Payment Order
D. 830	Planning Schedule
E. 836	Contract Award
F. 840	Request for Quotation
G. 843	Response to RFQ
H. 846	Inventory Inquiry
I. 850	Purchase Order (PO)
J. 855	PO Acknowledgment

The transaction set is at the top of the hierarchical organization of an EDI transaction. It describes all the groups of data necessary to communicate a complete document. The sequences of data within a transaction are specified by one or more data segments. [Ref. 10:p. 16]

A data segment is a subset of a transaction set. The smallest of the EDI building blocks is the data element. A group of functionally related data elements fit together to make up a segment. These elements represent the actual alphanumeric date, time, and other information related directly to a transaction. [Ref. 10:p. 16]

Not all segments and elements are required to be used in a transaction set, which causes opportunities for incomplete or ambiguous transactions. Because there are optional ways of conveying the same information, the standard is still not a standard across all industries. This has lead to the requirement for Implementation Conventions (ICs). An IC fully defines the transaction required to conduct business by tailoring the use of the standards' segments, data elements, and code values. In addition, the IC document the intended interpretation of a standard. [Ref. 3:p. 10] Although this refinement of the standards is required between individual trading partners, there is still the need for companies that do business with different industries to handle more than one standard. Thus, the problem of proprietary type standards continues, and only will be refined as EDI use grows.

D. ELECTRONIC FUNDS TRANSFER (EFT)/FINANCIAL EDI (FEDI)

1. Electronic Funds Transfer (EFT)

a. Definition

EFT is a subset of EDI. The distinguishing feature that separates EFT from other types of EDI is the involvement of financial intermediaries such as banks. [Ref. 5:p. 12] As noted in Chapter I, EFT is the bank-to-bank exchange of electronic payment instructions. EFT allows financial value to be transferred from one trading partner to another. In its strictest sense, EFT refers only to the actual value transfer process, as the following definition from the Code of Federal Regulations describes:

> Electronic fund transfer means any transfer of funds, other than a transaction originated by check, draft, or similar paper instrument, that is initiated through an electronic terminal, telephone, or computer or magnetic tape for the purpose of ordering, instructing, or authorizing a financial institution to debit or credit an account. The term includes, but is not limited to, point-of-sale transfers, automated teller machine transfers, direct deposits or withdrawal of funds, and transfers initiated by telephone. It includes all transfers resulting from debit card transactions, including those that do not involve an electronic terminal at the time of the transaction. The term does not include payments made by check, draft, or similar paper instruments at an electronic terminal. [Ref. 17: Section 205.2(g)]

The information flow of a simple EFT-based transaction is shown in Figure 2.1. First, the supplier sends an invoice to the buyer notifying him that payment is expected (step a). The buyer then instructs the bank to debit the

buyer's account and credit the account of the supplier (step b). Bank one then debits the buyer's account and communicates the payment instructions to bank two who then credits the supplier's account (step c). Lastly, bank two notifies the supplier that the payment has been received (Step d). The buyer may also send additional information to the seller notifying him of the reason for the payment (step e). [Ref. 5:p. 17-18]

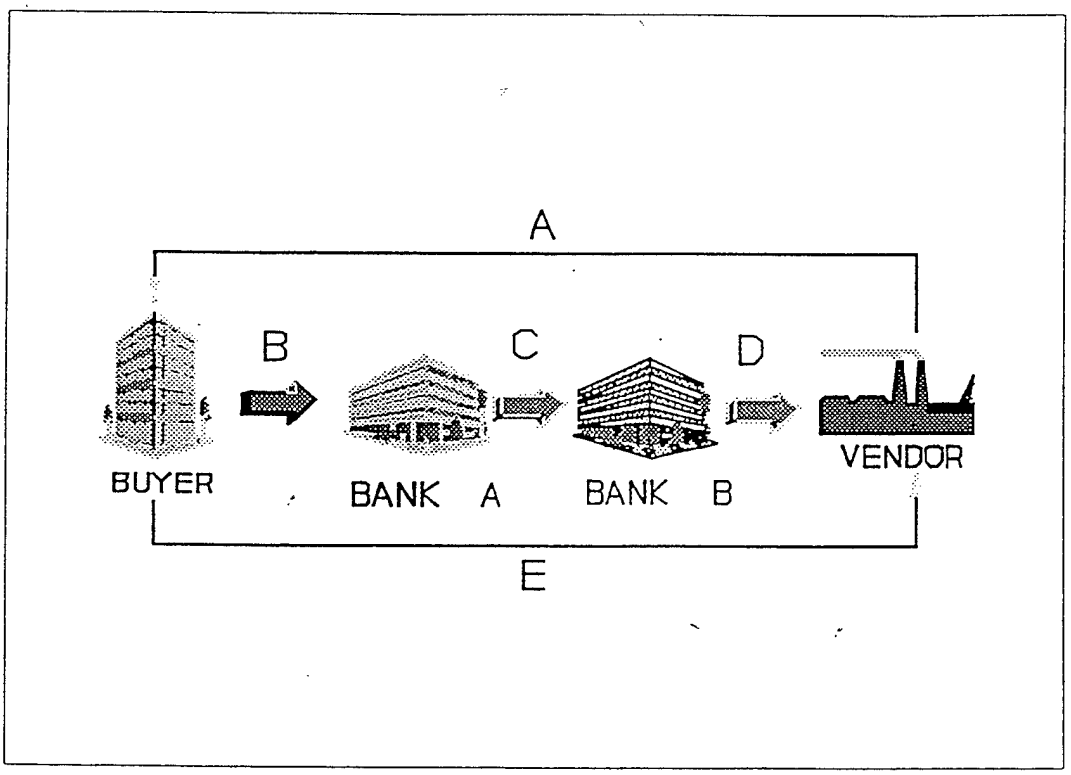


Figure 2.1: EFT-based transaction cycle
[Ref. 5:p. 18]

b. EFT Mechanisms

Under EFT, there are four major electronic methods of moving funds between accounts in the banking system:

FedWire, Automated Clearing House (ACH) transfers, Clearing House for Interbank Payment System (CHIPS), and Society for Worldwide Interbank Financial Telecommunications (SWIFT). [Ref. 10:p. 34] Each of these four electronic payment systems for EFT transmission have their own mechanisms for initiating and receiving an EFT transaction. The focus during this discussion will be on the ACH standardized formats, since the ACH is the primary means through which DoD electronic payments are made. [Ref. 18:p. 34] There are three primary mechanisms used by the banking industry: Cash Concentration and Disbursement (CCD/CCD+), Corporate Trade Payment (CTP), and Corporate Trade Exchange (CTX). [Ref. 18:p. 34]

CCD/CCD+ was the first EFT mechanism used by the Treasury and Federal Reserve in 1974, and it is still the most widely used today. [Ref. 18:p. 34] CCD originally lacked the ability to transmit remittance information, but was later amended to include this remittance data with each CCD payment, CCD+. CTP was developed as a pilot project by the National Automated Clearing House Association (NACHA) to try to expand upon the amount of remittance information that could be passed in the CCD+ format. [Ref. 18:p. 35] CTP is not widely used today due to format flaws and was widely recognized as simply an evolutionary EFT payment application. [Ref. 18:p. 36] CTX, also developed by NACHA, was the first banking application

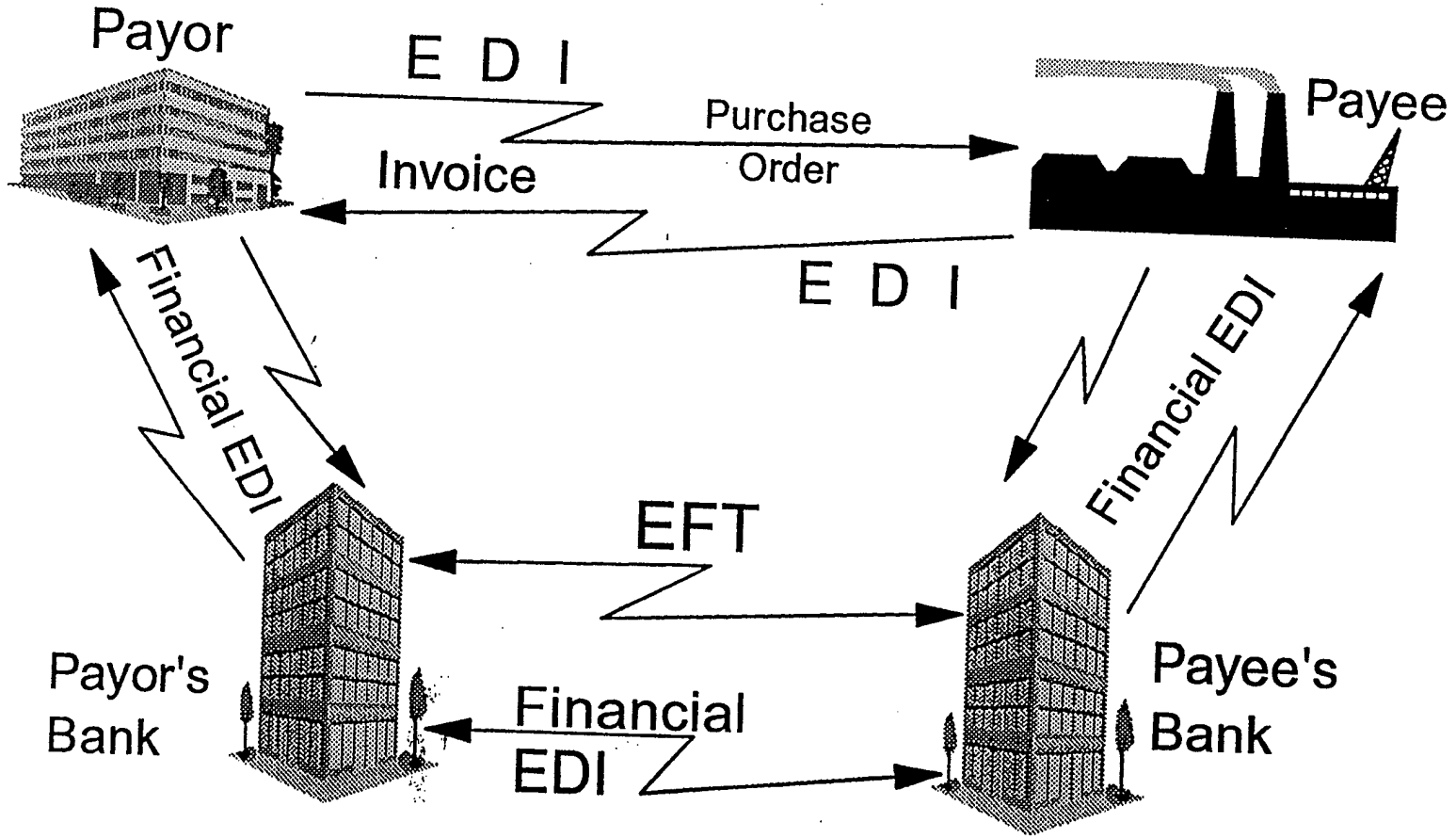
which is compatible with EDI standards. The EDI format used with CTX is the ANSI X12 820 (payment order/remittance advice) transaction set. [Ref. 18:p. 36] The expanded use of the CTX format has been limited because, although suited to transmit large amounts of remittance data along with the payment instruction, payments are typically for one invoice at a time. Therefore, the CCD+ format is still used the most in the Automated Clearing House Network (ACH). [Ref. 18:p. 37]

2. Financial EDI (FEDI)

a. Definition

FEDI is yet another subset of EDI, one which can include the EFT function in it. "Business entities can perform FEDI through interaction with their banks, however they do not perform EFT, which is strictly a banking function." [Ref. 18:p. 50] As noted in Chapter I, FEDI can be defined as "...the exchange of electronic business information between a firm and its bank or other financial intermediary." For the purposes of this research, this "electronic business information" will include any transaction that is associated with payment, such as invoice, remittance advice, and credit/debit memo. The relationship between EDI, Financial EDI, and EFT is illustrated by the flow chart in Figure 2.2.

Based on the benefits associated with traditional EDI services, a growing number of organizations are using FEDI



EDI: Firm to Firm transmission of data.
EFT: Bank to Bank transmission of value and data.
Financial EDI: Firm to Bank, Bank to Firm, Bank to Bank transmission of data. Bank to Bank may transmit value with data.

Figure 2.2: The Relationship Between EDI, Financial EDI, and EFT
[Ref. 5: p. 13, Figure 2]

to send and receive payments and remittance information electronically. As companies experience success in automating their purchasing systems, they want to automate their payment systems as well. "Several influential institutions--including General Motors, Sears, GE, and the U.S. Treasury--have been pioneers in implementing financial EDI." [Ref. 19:p. 31] This is where the banks enter the picture and where the considerable opportunities--and challenges--begin.

b. Value-Added Banks (VABs)

"FEDI is a logical extension of the cash management services banks traditionally have delivered to corporate clients." [Ref. 19:p. 31] One definition for a Value Added Bank (VAB) is as follows:

> A VAB is a bank which provides education and consulting expertise to corporate and institutional customers as those customers plan, implement, and utilize Financial EDI, and provides a wide array of financial EDI operating services which enable the companies to achieve their productivity goals in Treasury, Accounts Payable, and Accounts Receivable operations. [Ref. 20:p. 41]

As companies move to more EDI transactions, they expect their banks to meet their electronic payment and information requirements. "Banks that fail to do so stand to lose the business to other banks, or at least lose the information processing portion of the business to Value-Added Networks (VANs). [Ref. 19:p. 31] As noted by Ned C. Hill, a business professor at Brigham Young University, and senior

editor of *EDI Forum: The Journal of Electronic Data Interchange:*

> Global and large regional banks stand to lose a lot of processing fees if they don't offer Financial EDI services. Already some companies are saying, If my bank can't handle electronic payments, then we'll just bypass them and take another route. In addition, financial EDI promises substantial long-term benefits for banks through lower processing costs and fewer errors. [Ref. 21:p. 1]

With these benefits, banks should be enthusiastically embracing FEDI. Yet, as the next section will indicate, acceptance by industry has been slow. [Ref. 21:p. 1]

3. EFT/FEDI Use by Industry

As noted earlier, the acceptance and use of FEDI by industry has been slow. According to NACHA, business-to-business ACH payments classified as FEDI reached nearly 10 million annually in the United States in 1992. However, that same year, regular EDI transactions were approximately 750 million, according to D.J. Masson at The EDI Group, Ltd., an industry-research and publishing firm based in Oak Park, Illinois. [Ref. 21:p. 1]

There are several reasons for FEDI's slow acceptance:

- Financial EDI is in its infancy, with few banks having developed the sophisticated capabilities necessary before the beginning of this decade. Regular EDI is much more established.
- Many businesses don't believe they get as much of a return on their investment from financial EDI as they do from regular EDI. The cost of manually producing and mailing a check is

estimated to be US$5 to $20; processing a purchase order can cost up to $100. So, using regular EDI to eliminate paper-based purchase orders and similar documents offers much greater savings potential than using financial EDI to make or receive payments.

- Another obstacle for some companies is float. Corporate treasurers have been very reluctant to give up float. This is changing, however, with today's low interest-rate environment reducing float's value and with the Federal Reserve doing its best to wring float out of the payment system.

- Many U.S. banks that are competent at processing standard ACH transactions simply do not have the systems in place to handle the wide array of formats for financial EDI. [Ref. 21:p. 2]

Although FEDI lags behind traditional EDI in most enterprises, many believe that FEDI is posed for substantial growth. As Victor S. Wheatman, President, Northern California EDI Users Group notes:

> Most corporations have been relatively slow in their uptake of financial EDI (FEDI) despite the benefits. For example, NACHA (National Automated Clearinghouse Association) surveys have found that corporate paper-based payments cost approximately $8.33 while FEDI payments cost $3.00. Other surveys have found even more impressive ratios: Paper checks cost the U.S. Treasury 30.2 cents while EFT costs 4.5 cents. We believe FEDI lags behind traditional EDI in most enterprises by about five years due to application integration problems and business process change requirements. Further, financial managers have often been limited participants in EDI/EC task groups. Those that have been involved have often been resistant to FEDI because they wish to preserve the float-the use of funds until a check clears. However, float neutral payment terms are negotiable, or payment can be delayed until due. [Ref. 22:p. 1]

As problematic as adoption of FEDI appears, many believe that "...growth in FEDI volume will be rapid and sustained as corporations integrate accounts payable with their Electronic Commerce and EDI capabilities, as the impact of mandatory corporate tax payment programs kick in, as health care payments move to FEDI, and as government agencies move their vendor payments to FEDI." [Ref. 22:p.1] This increasing trend has been recently noted by NACHA in statistics released that indicate an annual 20 percent growth in FEDI transactions. [Ref. 22:p. 1] Despite this recent growth rate, "...FEDI remains an embryonic market--there are over 11.5 billion inter-enterprise paper check transactions yearly." [Ref. 22:p. 1]

Chapter III will look at the DoD payment system and its attempts to take advantage of this relatively new electronic payment system.

III. CURRENT STATUS OF EFT/FEDI IN DOD CONTRACTING

A. INTRODUCTION

The third milestone for EDI implementation delineated in the October 1993 Presidential memorandum required the development of FEDI and the use of EFT. As noted, these two complementary capabilities will allow the interchange of financial transactions such as invoicing, payment, and remittance advice. Based on past problems associated with vendor payments, these business transactions are ripe for EDI implementation. This chapter will address the current state of EFT/FEDI implementation in DoD contracting to assess if the mandates of the Presidential memorandum are being met.

Prior to determining the current state of EFT/FEDI in DoD contracting, it is important to understand the basic history of electronic payments. Also, it is important to understand the basics of the DoD contract/payment accounting cycle. Finally, DoD's attempts to incorporate EFT/FEDI into its contract payment process will be provided.

B. HISTORICAL OVERVIEW OF ELECTRONIC PAYMENTS

1. The Federal Reserve System (FRS)

It is appropriate to begin a review of electronic payments with the FRS since it was an early leader in the development of electronic payments. [Ref. 18:p. 13] The

purpose of the FRS is to provide "...fiscal agency and depository services to the Department of the Treasury." [Ref. 23:p. 727] "With the growth in the use of checks as a payment mechanism throughout this century, the FRS, in cooperation with commercial banking, became the network by which checks are cleared." [Ref. 18:p. 13] The role of the Federal Reserve in electronic payment systems can best be described in its general policy statement:

> The Federal Reserve has a wide-ranging participatory role in the payments system. The Federal Reserve assisted in developing the Automated Clearinghouse (ACH) system for small-dollar electronic payments and now provides a nationwide electronic ACH network. Depository institutions transfer large dollar payments over the Federal Reserve's nationwide wire transfer system (Fedwire). [Ref. 24:p. 293]

The payment services provided today by the FRS for the U.S. Treasury can be broadly classified into two categories, depository services and fiscal agency services. [Ref. 18:p. 19] Depository services, which fall under the control of the Financial Management Service (FMS), encompass electronic payments. The role of the FMS can be summarized as follows:

> The FMS acts as the cash manager for the Government, managing a daily cash flow in excess of $10 billion. It manages many of the financial services offered by the Government agencies, disburses 85 percent of all Federal payments through its payment systems, and reconciles all Government payments from its seven Regional Finance Centers. It is the FMS to which DoD reports its disbursements. [Ref. 18:p. 20]

Two major events in the bank check clearing process fostered the development of electronic payments:

> First, banks were among the initial users of computers, which were originally used for bookkeeping, accounting, and check sorting tasks. By the early 1960's the volume of checks exceeded 12 billion, and concerns were raised that the check processing system would not be able to handle the rapid growth. The second major event was the introduction of magnetic ink character recognition (MICR), which permitted electronic scanning and, thus, rapid, efficient processing of checks. [Ref. 18:p. 14]

These two events combined helped save the check clearing process from collapse and set the stage for the movement towards electronic payments.

2. The Automated Clearing House

The next step in the evolutionary process for electronic payments came with the advent of the Automated Clearing Houses (ACHs). This concept to substitute electronic payments for paper checks began to evolve in the late 1960's:

> The need to improve the nation's payments system was recognized as imperative in the late 1960's. Special task forces began to develop a workable alternative to paper checks before the volume became overwhelming. A direct result of the early groundwork was the establishment of the first automated clearing house (ACH) for the exchange of paperless entries, the Calwestern Automated Clearing House Association (CACHA), in 1972. [Ref. 25:p. OG-1]

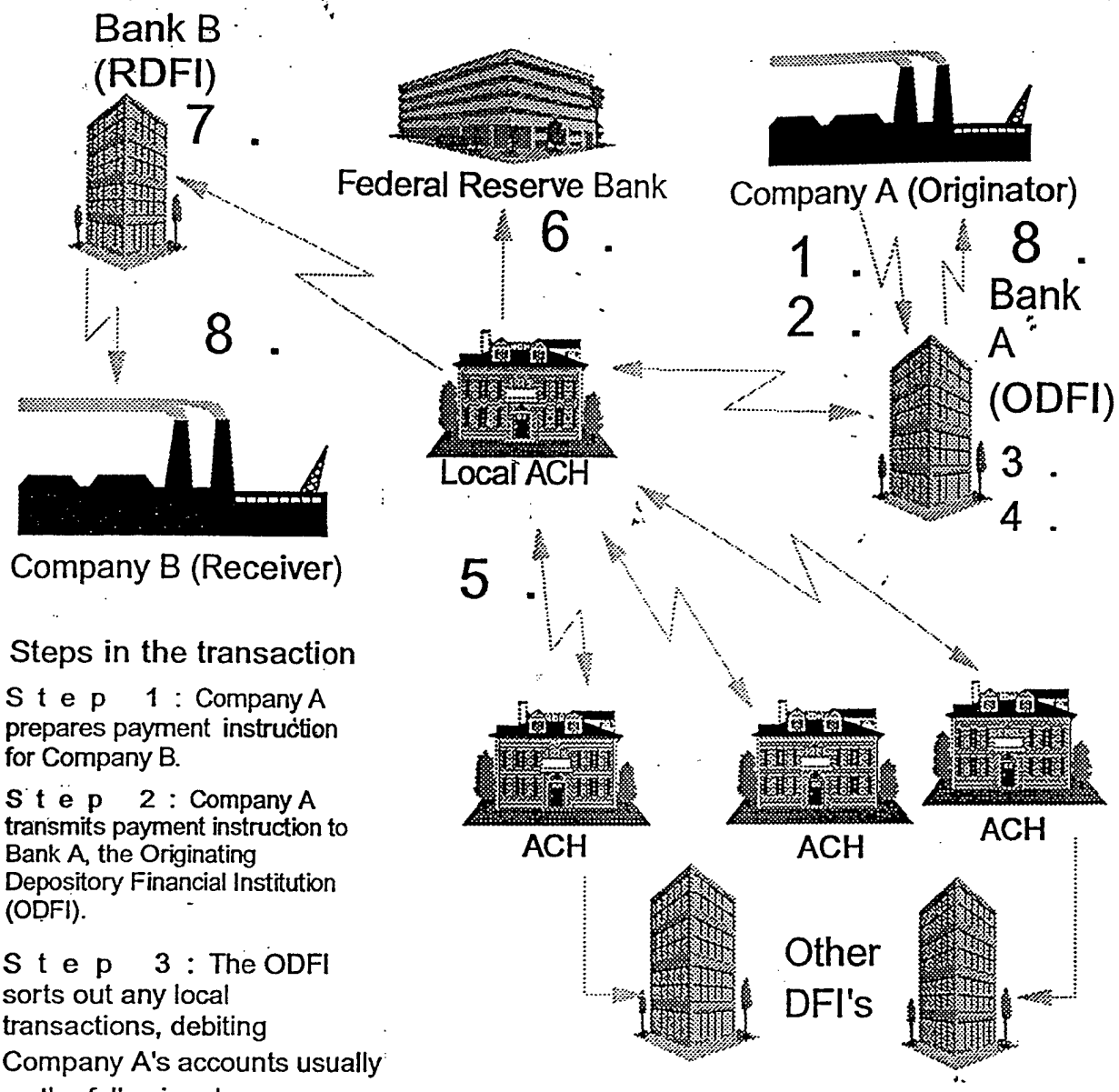
The FRS was active in the ACHs from the beginning and in forming the National Automated Clearing House Association (NACHA) in 1974 to coordinate the expansion of the ACH network

nationwide. [Ref. 18:p. 14-15] This formation of the NACHA allowed the FRS to establish standards for the ACH nationwide network.

This ACH network is vital to the electronic payments system of the FRS. The majority of high volume, small dollar amount payments are transmitted via an ACH network. [Ref. 18:p. 25] An ACH transaction requires five participants: the Originator, Originating Depository Financial Institution (ODFI), Automated Clearing House Operator (ACH), Receiving Depository Financial Institution (RDFI), and the Receiver. [Ref. 18:p. 27] Figure 3.1 provides a flowchart to explain a typical ACH transfer. It is important to note that an ACH transfer is not an instantaneous transfer of funds. There is usually a one-day lag between the time the transfer is initiated and the payment is received.

3. Federal Reserve System Electronic Payment Systems

The ACH network is the primary focus for this research into EFT/FEDI in DoD contracting because most DoD payments sent electronically are transmitted via an ACH network. However, there are three other electronic payment systems that are used by various institutions and should be noted to close out this section: (1) Fedwire (operated by the FRS), (2) Clearing House Interbank Payments System (CHIPS), a private domestic system, and (3) the Society for Worldwide Interbank



Steps in the transaction

S t e p 1 : Company A prepares payment instruction for Company B.

S t e p 2 : Company A transmits payment instruction to Bank A, the Originating Depository Financial Institution (ODFI).

S t e p 3 : The ODFI sorts out any local transactions, debiting Company A's accounts usually on the following day.

S t e p 4 : The ODFI merges transactions from Company A and other companies for transmission to the local ACH.

S t e p 5 : The local ACH sorts out intra-regional transactions from interregional transactions. Inter-regional transactions are transmitted the following day.

S t e p 6 : The local ACH sends data to the Fed, debiting the ODFI account and crediting the RFI account held at the Fed.

S t e p 7 : The local ACH transmits data to Bank B, Company B's bank. This transmission contains all transactions pertaining to that bank.

S t e p 8 : The ODFI debits Company A's account, while the RDFI credits Company B's account, usually on the following day.

Figure 3.1: A Typical Automated Clearing House Transfer
[Ref. 5:pp.15-16]

Financial Communications (SWIFT), an international electronic mail payment system. [Ref. 18:p. 22]

a. FEDWIRE

FEDWIRE is the primary means the Federal Reserve Banks use to conduct large fund transfers electronically. [Ref. 18:p. 23] FEDWIRE is described as follows:

> [FEDWIRE is] an electronic facility operated by the Federal Reserve banks used for (1) credit transfers of reserve balances among banks across the books of the Federal Reserve Banks and (2) the transfer among banks of book-entry U.S. government and agency securities in a delivery-versus-payment environment on the books of the Federal Reserve Banks. In 1990, the daily average number of funds transfers on Fedwire was about 255,000, with a daily average value of about $790 billion; the daily average number of securities transfers was about 45,000, with a daily average value of about $400 billion. [Ref. 25:p. 82]

FEDWIRE transfers are performed in real time (i.e., no delay) and are labor intensive. Therefore, they are expensive transfers at 10 to 20 dollars per transaction. [Ref. 18:p. 23]

b. Clearing House Interbank Payments System (CHIPS)

CHIPS is described as follows:

> CHIPS is operated exclusively for New York financial institutions by the New York Clearing House Association. Most international banking funds transfers are cleared through CHIPS. CHIPS is unique in that no monetary value changes hands until the end of the business day. Electronic bank account debits and credits are tabulated throughout the business day, and a final net debit or credit funds transfer is made at the end of the day. [Ref. 18:p. 24-25]

Through its approximately 130 participants, CHIPS averages 150,000 transfers, valued at about $890 billion each day. [Ref. 26:p. 82]

c. Society for Worldwide Interbank Financial Communications (SWIFT)

The SWIFT is an international electronic mail system used to transfer funds. [Ref. 18:p. 25] It has no affiliation with the FRS, but may interface with payment mechanisms operated by the FRS. [Ref. 18:p. 25] SWIFT works as follows:

> SWIFT is actually a Value-Added-Network (VAN) operated for over 1600 member banks in 54 countries. SWIFT handles nearly one million messages each day. Each message is sent in the form of a proprietary SWIFT format designed to handle information relating to payment instructions, letters of credit, trade information, transaction confirmations, balance reports, deposit reports, etc. Since there is no Federal Reserve on an international basis, payments are cleared through correspondent account banks. [Ref. 5:p. 17]

4. Significant Electronic Payment Legislation

There have been countless regulations and laws concerning the use and advancement of electronic payments. Three significant events that truly affected the direction and nature of electronic payments will be discussed, as well as one law that directly affects the timing of DoD contractor payments.

a. *The National Commission on Electronic Funds Transfer*

The National Commission on Electronic Funds Transfer was created by Congress in 1974. [Ref. 18:p. 15] The Commission was created because of concerns that the rapid growth of EFT without legislative oversight might "...result in distortions to competition and the invasion of individual citizens' right to privacy and confidentiality." [Ref. 27:p. 3] The Commission reviewed issues of competition in financial institutions, consumer protection, and confidentiality, and economic and monetary policy. [Ref. 18:p. 15]

The Commission's final report makes the following general conclusion:

> ...EFT should be allowed to develop free from unnecessary regulation and to remain as open as possible to marketplace pressures and consumer demands. In this way, innovation will be sparked, the largest possible array of alternative EFT services and systems will be placed before users and consumers, and the unfettered choice among these alternatives will produce an EFT environment that is most responsive to the public's needs and desires. [Ref. 27:p. 4]

Also significant from the Commission's findings is their comments on the role of the Federal Reserve in the ACH process. The Commission recommended:

> ...that it is appropriate for the Federal Reserve to continue to provide the basic level of ACH-type services necessary to clear and settle batched electronic payments between depository institutions locally, regionally, and interregionally. The Commission also recommends that the Federal Reserve

> not discriminate against the private sector development, establishment, and operation of alternatives to Federal Reserve ACH facilities. [Ref. 27:p. 214]

b. The Monetary Control Act of 1980

The Monetary Control Act of 1980 had a significant impact on the proliferation of payment systems. It was originally passed for two purposes, (1) to recoup Federal Reserve operating expenses through a fee-for-service requirement and (2) to permit open competition with the private sector for financial payment services. [Ref. 26:p. 86] By charging fees, the intent of the Act was to encourage competition in the private sector for various payment systems. This offer of competition with the FRS has been criticized as noted in the following statement:

> It is important to note, however, that Congress did not mention private competition explicitly in the 1980 Act. The Fed, consequently, does not have a clear, legislative mandate to encourage or foster private competition in payment services. It is thus possible to suggest a different interpretation - that perhaps Congress was mostly concerned with cutting the public subsidy of payment services and leveling the playing field between Fed member institutions and non-members, and that perhaps it did not care so much about private competition. [Ref. 28:p. 224]

The significance of the lack of competitive payment services available to DoD will become clearer in Chapter IV as application of lessons learned by private industry are discussed.

c. The EFT Expansion Act

President Clinton signed landmark FMS Legislation in April, 1996, that will dramatically improve the way millions of Americans receive payments from the Federal Government. The EFT Expansion Act will virtually eliminate the use of the check as a Federal payment instrument by the turn of the century. The Act requires that all Federal payments, except Internal Revenue Service (IRS) tax refunds, be issued via EFT by January 1, 1999. [Ref.55:p. 30] The wording of the Act specifically includes payments to vendors.

d. The Prompt Payment Act

The Prompt Payment Act of 1982, Public Law (PL) 97-177, and the Prompt Payment Act Amendment of 1988, PL 100-496, were implemented in an effort to improve the timeliness of Federal payments to commercial vendors. [Ref. 57:p. 1] The intention of the Prompt Payment Act was to improve the Government's performance in the marketplace by ensuring that it pays its bills in a timely manner. The Prompt Payment Act requires the Government to pay interest on invoices if they are not paid in a timely manner. [Ref. 34:para. 32.905] In general, the implementing language in the Federal Acquisition Regulation (FAR) concerning the timeliness of invoice payments is as follows:

> The due date for making an invoice payment by the designated payment office shall be ... the 30th day after the designated billing office has received a proper invoice from the contractor, or the 30th day after government acceptance of supplies delivered or services performed by the contractor, whichever is later. [Ref. 34:para. 32.905]

Prompt payment, although important to all businesses is critical for small businesses. By providing payment time standards, the Prompt Payment Act has reduced a number of very late payments.

C. THE DOD CONTRACT PAYMENT/ACCOUNTING CYCLE

As aptly noted by Lieutenant Daniel J. Smith in his thesis titled *Electronic Payments in DoD Contracting,* "To do a proper study of DoD's EFT and contract payment initiatives, one should begin with an understanding of how the payment and accounting cycle works." [Ref. 18:p. 55] As he goes on to explain:

> To analyze the impact of EFT without understanding the payment process would be incomplete. The multitude of DoD Agencies, computer systems, and internal procedures to process contract payments and properly account for them presents a formidable challenge when trying to unravel the process and present it as a pay/accounting flow chart. [Ref. 18:p. 55]

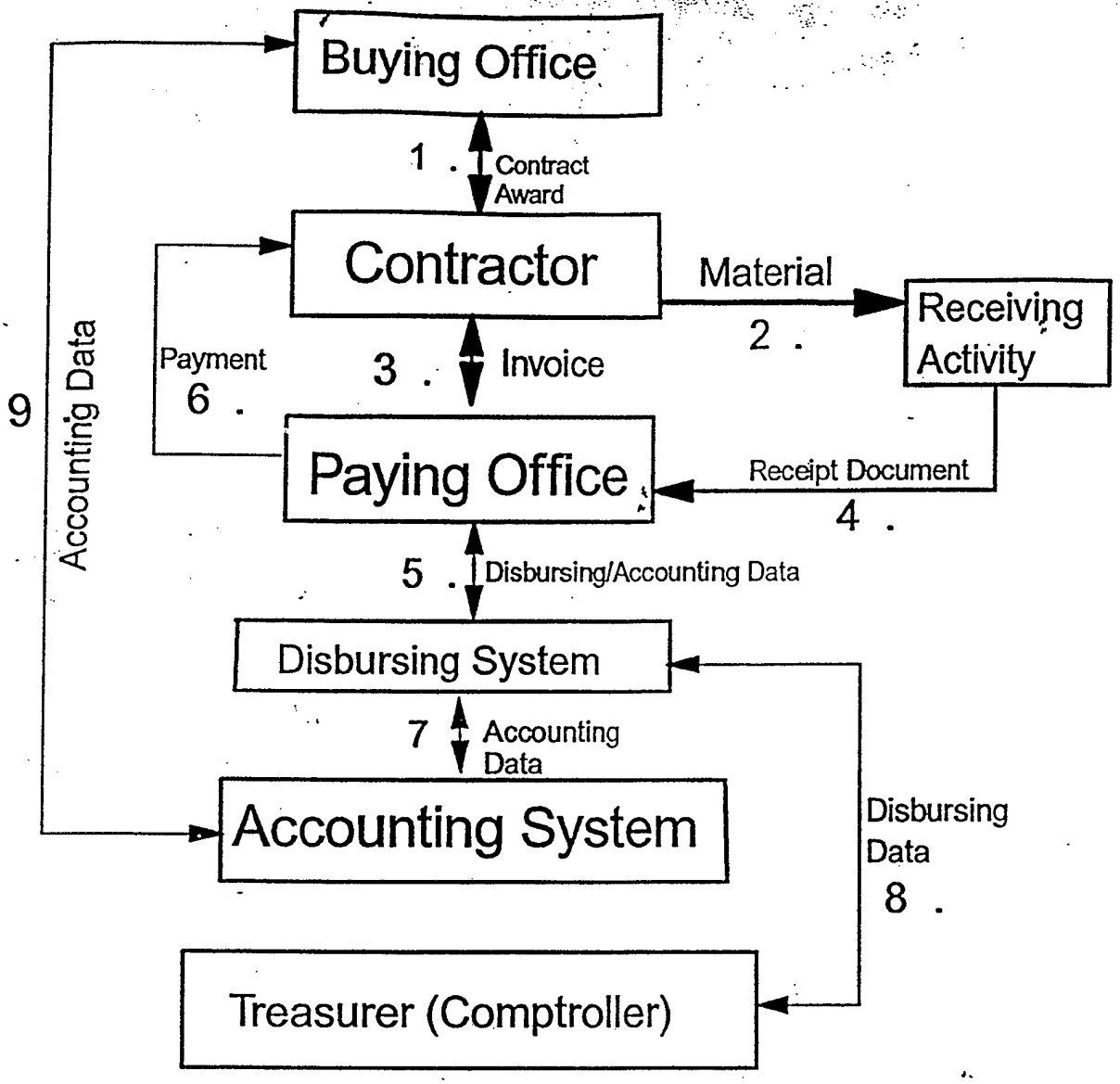
Following Lt. Smith's example, this section will attempt to "unravel the process" by following an invoice from submission to payment and to see what happens with the disbursing and accounting data.

Using a "conceptual" pay and accounting cycle, Figure 3.2 outlines the process by which a typical invoice may be processed. This process is the same regardless of the actual organizations and computer systems involved. As can be observed from the diagram, the invoice processing system is a step system. In other words, each step in the process depends on the previous step being performed, and performed correctly. Any errors in one step will cause rework at some point in the process. Using these underlying thoughts, each DoD activity in the process will be briefly discussed along with its role in the pay/accounting cycle. After reviewing the components separately, they will be consolidated into a flow chart diagraming the entire pay/accounting cycle.

1. Defense Management Review Decision (DMRD) 910

Before beginning the pay/accounting cycle review, it is necessary to briefly describe the impact that Defense Management Review Decision (DMRD) 910 has had on the process:

> On October 1, 1992, when DMRD 910, "Consolidation of DoD Accounting and Finance Operations" took effect, the Defense Finance and Accounting Service (DFAS) was tasked with standardizing and consolidating finance and accounting applications throughout DoD. Six centers were established (including DFAS-Columbus Center), with Washington, D.C. as Headquarters. Of the six centers, DFAS-Columbus Center was tasked as the primary contract payment site. [Ref. 18:p. 57]



A Typical Transaction:

Step 1. Contract awarded, sent to contractor.

Step 2. Material Sent to Receiving Activity.

Step 3. Invoice sent to Paying Office.

Step 4. Receiving Activity sends Receipt notice to Paying Office.

Step 5. Invoice processed for payment, data entered onto disbursing system.

Step 6. Contractor payment sent.

Step 7. Accounting System updated.

Step 8. Disbursing/Balance Sheet data submitted to Treasurer.

Step 9. Data provided to Buying Office.

Figure 3.2: A Conceptual Payment/Accounting Cycle
[Ref. 18:p. 56, Figure 7]

Thus, for the purpose of this discussion on the pay/accounting cycle, DFAS-Columbus Center will be the paying office to be reviewed.

2. The Buying Office

The Buying Office in our conceptual pay/accounting cycle will be treated as a generic buying office. This is done to keep the discussion on a level that focuses on the payment and not the individual needs of the buying offices. For example, some buying offices would need asset visibility or inventory database interfaces from their payment/accounting systems. However, since DMRD 910 consolidated the payment function, buying offices now rely on the information they get from the automated system at DFAS. Therefore, the buying office in our example will be considered to be generic to the payment function.

3. The Role of the Contractor

The contractor plays a vital role in the pay/accounting cycle. This role is delineated for the contractor by the terms of the contract, the FAR, and the DoD Federal Acquisition Regulation Supplement (DFARS). The most important aspect of the role the contractor plays is the proper completion and distribution of the DD 250, Material and Inspection Reports (which is authorized for use as an invoice and detailed in Appendix F of the DFARS). There is a useful

guide, Contract Payment Information, distributed by DFAS-Columbus Center which provides DD 250 and invoice preparation guidance beyond that provided for in the DFARS. Even with the guidance available, the requirements can be complex, so contractors do make errors in invoice submission. [Ref. 18:p. 59] The DFAS-Columbus Center guide outlines the most common errors, as follows:

- Failure to properly distribute the DD Form 250.
- Preparation errors on DD Form 250.
- Preparation errors on invoice [contractors own invoice in lieu of the DD Form 250].
- Extraneous documents sent to payment office with invoice.
- Invoicing multiple shipments on a single commercial invoice. [Ref. 29:p. 11]

Even after submitting the invoice correctly, it is vital to a vendor to receive payment information to determine when payment is expected. This information is vital because cash management is critical to the day-to-day operations of a business.

4. The Role of the Receiving Activity

The receiving activity plays a small but vital role in the overall pay/accounting cycle:

> Without an acknowledgment of receipt, the invoice will not be paid. Receipt takes two general forms. Free-on-board (FOB) destination shipments are received by the activity where the material is shipped. For FOB source shipments, the material is accepted at the contractor's plant before shipment, typically by a Quality Assurance Representative (QAR) or some other authorized Government representative. For the FOB source shipment, it is the acceptance at the plant that is necessary for invoice payment. [Ref. 18:p. 60]

The receipt date is significant for two reasons; (1) it determines when any contractor discount period begins, and (2) it starts the "Prompt Payment" time period. [Ref. 18:p. 60] "It is the receiving (or acceptance for FOB source) signature that initiates the start of the time period for the Government to process and pay the invoice." [Ref. 18:p. 60]

5. DFAS-Columbus Center: The Role of the Paying Office

The Defense Finance and Accounting Service-Columbus Center is one of six DoD finance centers. DFAS-Columbus' area of responsibility is in DLA/Contract payments. DFAS-Columbus Center identifies its contract payment section as Contract Administration Services (CAS). [Ref. 18:p. 62] The CAS is divided into five regional directorates (Northeast, Mid-Atlantic, Central, South, and West). [Ref. 28:p. 2-2]

As the paying office, DFAS-Columbus Center is ultimately responsible for payment to the contractor. [Ref. 18:p. 66] To perform its mission, DFAS-CO requires:

- A proper invoice from the contractor;
- receipt acknowledgment (or acceptance);
- current contract information, such as modifications, amendments, etc.;
- if an electronic payment is to be made, an agreement with the contractor (referred to as a Trading Partner Agreement, or TPA) identifying the proper banking related information; and
- sufficient funds in the appropriation to pay the invoice. [Ref. 18:p. 66]

Making proper payment after receipt of this information is only part of the process for DFAS-CO. They must also report the payment to an appropriate accounting and/or disbursing system. As noted, DFAS-Columbus Center needs complete, accurate information to perform its mission. Without it, the payment cycle can abruptly halt. [Ref. 18:p. 66]

To deal with the growth in the CAS payment role, DFAS-CO uses The Mechanization of Contract Administrative Services (MOCAS). The MOCAS system is described as follows:

> ...[An] internal system designed by the Defense Logistics Agency (DLA) to implement and respond to MILSCAP [Military Standard Contract Administrative Procedures]. It is an automated data system which provides line management and operational data on delivery schedules, shipments, contractual changes, and disbursements to contractors. [Ref. 30:p. 2]

"The MILSCAP format contains selected contract data elements in an 80-column format which permits the MOCAS system (and

other DoD systems) to interface with other DoD activities." [Ref. 18:p. 64]

The MOCAS system is a mainframe, batch processing system used for invoice processing, payment, and reporting. [Ref. 18:p. 64] The electronic payment function of MOCAS was an in-house add-on that will be discussed later.

6. The Disbursing System: The Navy's Financial Reporting System

"Once the MOCAS system at DFAS-Columbus Center has made the payment, the pay related data (i.e., payment amount, appropriation charged, contract, etc.) must be reported so that the expenditure is registered against the proper appropriation." [Ref. 18:p. 66] This consolidation point for all Navy disbursements is the Navy's Financial Reporting System (FRS). The FRS collects the daily disbursement data from Navy and DoD payment sites, such as DFAS-CO. [Ref. 18:p.66] This information is reported to the FRS by the various accounting/payment systems issuing Navy payments, such as MOCAS. [Ref. 18:p.66] The further workings of FRS are beyond the scope of this research. Suffice it to say that FRS checks for errors in accounting data, catches undistributed disbursements and provides the user this information for reconciliation of their records. On a weekly basis the FRS accumulates the daily disbursements, balances its books, and transmits the data to the next higher level, the Navy's

Centralized Expenditure/Reimbursement Processing System (CERPS). [Ref. 18:p. 68]

7. The Role of the Accounting System

There are many accounting systems in DoD, but at a minimum they all perform the following functions:

- Match disbursements to the proper appropriated account (referred to as obligations);
- maintain local accounting records;
- perform reporting functions; and
- perform data query functions. [Ref. 18:p. 68]

The Navy's Standard Accounting and Reporting System (STARS) is the Navy's principal accounting, reporting and payment system. [Ref. 31:preface] "STARS performs two major functions, invoice payment (disbursement function) and the accounting function. Disbursements from the STARS system utilize the CMET process to identify undistributed disbursements." [Ref. 18:p. 69] All Authorized Accounting Activities (AAA) must correct these errors, and undistributed disbursement correction is a difficult, labor intensive task. [Ref. 18:p. 69]

The STARS system is the Navy's accounting system, but regardless of the component agency, all accounting systems perform essentially the same function for the AAA. That is, they match expenditures to the proper appropriation, update

the accounting ledgers, perform data queries and reporting. [Ref. 18:p. 71] "If an error is made in assigning the correct appropriation data to the payment, the accounting process can stop dead in its tracks (undistributed disbursement) until it is cleared up, typically through a labor intensive review effort." [Ref. 18:p. 71-72] Therefore, one of the most important requirements of the accounting system in the cycle is proper data entry at each previous step in the process. [Ref. 18:p. 72]

8. The Reporting Process to the U.S. Treasury

The Navy's Centralized Expenditure/Reimbursement Processing System (CERPS) is the final system in the payment/accounting cycle. [Ref. 18:p. 72] CERPS acts as a "clearing house for Navy level accounting distribution transactions." The CERPS system takes the Navy's consolidated disbursements, combines them with other DoD and non-DoD disbursements made against Navy appropriations, referred to as "cross disbursements," and reports this monthly to the U.S. Treasury's Financial Management Service as the Navy's Statement of Accountability. [Ref. 18:p. 72]

9. The Payment/Accounting Cycle Flow Chart

Figure 3.3 provides a step-by-step process of a typical Navy invoice. Important to note is that the EFT/FEDI portion of the payment/accounting cycle makes up only one step in the

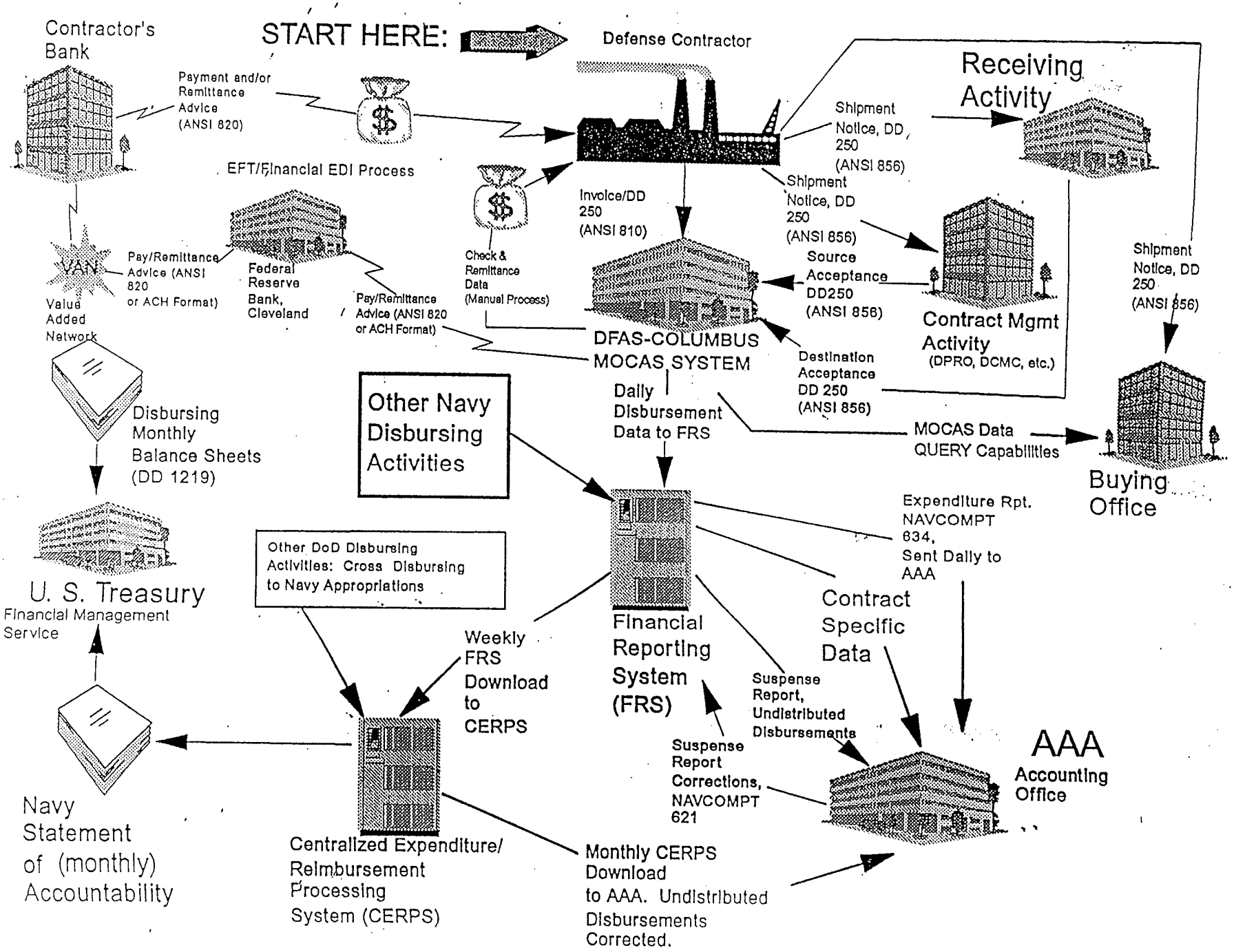


Figure 3.3: DoD Contractor Payment/Accounting Cycle (Navy Invoice)
[Ref. 18:p. 202, Appendix C]

entire process. However, it is important to understand the entire payment/accounting process to fully understand the complexity of the system. With the payment/accounting cycle identified, the next section will discuss some current EFT/FEDI applications as well as future electronic payment initiatives.

D. CURRENT EFT/FEDI APPLICATIONS AND INITIATIVES

As noted in the 1996 DFAS Strategic Plan, Message from the Director, "The Department of Defense is in the midst of the most comprehensive reform of its financial management systems and practices in its history." [Ref. 54:p.1] As the Director, Richard V. Keevey, goes on to explain:

> These reform efforts are driven by two pressing needs--first, the need to overcome decades-old problems in financial management systems and procedures, and second, the need to meet sharply lower budget levels by fundamentally redesigning the way government works in this area. [Ref. 54:p. 1]

The "decades-old problems" Mr. Keevey mentions are highlighted by what DFAS refers to as problem disbursements. Problem disbursements include unmatched disbursements and negative unliquidated obligations. As of March 1996, DFAS is attempting to manually reconcile over $25 billion worth of problem disbursements. [Ref. 56] As the 1996 DFAS Strategic Plan indicates, these problem disbursements will be addressed by significantly increasing "...the extensive use of

electronic data interchange...electronic invoicing and electronic certification of receipt and acceptance as well as payments by electronic funds transfer." [Ref. 54:p. 6]

The underlying goal of successful development and implementation of EFT/FEDI is to provide timely and accurate contract payments. To this end, DoD has been automating its accounting, payment, and disbursing systems for decades. Unfortunately, this has caused a proliferation of proprietary Automated Information Systems (AISs). This section will focus on only a couple to demonstrate the current use of EFT/FEDI to electronically pay DoD contractors. The second part of this section will introduce and discuss current initiatives to address the consolidation of the various AISs.

1. The Standard Electronic Processing System (SEPS)

a. Background

The Standard Electronic Processing System (SEPS) began as the STARS Electronic Processing System (SEPS). SEPS was begun as an initiative under the Naval Supply System Command (NAVSUP) to provide an electronic payment module for the STARS system. With the DMRD 910 consolidation, the STARS system (and SEPS project) were capitalized under DFAS-Cleveland, thus the name change to "Standard." [Ref. 18:p. 84] SEPS provides a comprehensive EDI payment package for the

contractors and DoD activities alike. Figure 3.4 provides a flowchart of the SEPS concept.

b. SEPS System Characteristics

The SEPS program was initiated with the following objectives:

> To improve accuracy within STARS, abbreviate the time required for various activities, reduce the volume of paper documents, and eliminate as much as possible through the use of Electronic Data Interchange (EDI) Standards. [Ref. 32]

Contractors participating in the SEPS program may choose electronic payment via a Vendor Express (ACH network) format, or may choose a FEDI format (ANSI 820). [Ref. 31:p. 22]

The SEPS EDI/EFT Expansion Program Master Plan identifies key characteristics of the SEPS program as follows:

- To provide a completely paperless administrative system based on electronic processing and communication methods...
- To perform the entire process for contract data distribution, invoicing and payment processing without human intervention or data transcribing from the point of the data source to the final data recipient of each EDI transaction set.
- To define and interlink (or establish) a distributed, functionally oriented network of computer systems and support facilities where each component is designed to function independently but in an environment of planned compatibility.
- To employ proven, market matured technology for each component of the system [ANSI X.12 standards]. [Ref.31:pp. 8-9]

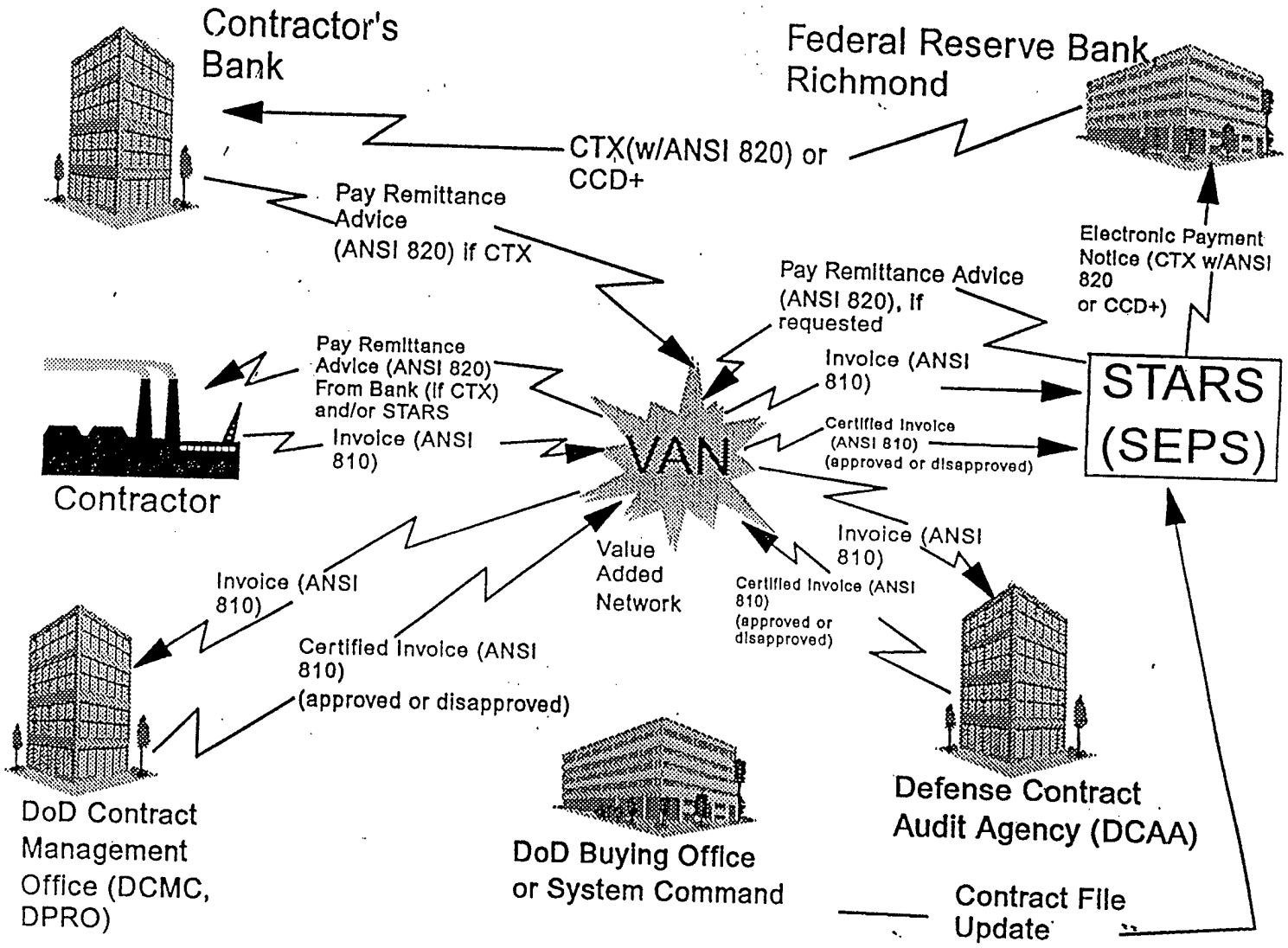


Figure 3.4: SEPS EDI/EFT Concept Invoice Processing
[Ref. 31: Fig. 3A, 3E]

As can be seen, SEPS is a comprehensive system, from invoice to payment, utilizing key EDI transaction sets. [Ref. 31:p. 10] Figure 3.5 delineates the Financial EDI/EFT payment process using SEPS.

2. Electronic Payment Applications at DFAS-Columbus Center

Electronic payment expansion at DFAS-Columbus Center became a priority following recommendations made in the LMI report, "Defense Finance and Accounting Service: An Electronic Commerce Program," published in May 1991. [Ref. 28:pp. 3-5,6] LMI provided the following assessment:

> Our assessment shows that many of the paper documents processed in the CAS (Contract Administration Services) and Stock fund payment mission areas are excellent EDI candidates. Both areas process a large and increasing number of documents; they have a manageable number of trading partners, most of whom are EDI capable; and they have the automated systems needed to support EDI transactions. [Ref. 28:p. 3-6]

Figure 3.6 provides a schematic of the LMI plan, and shows those EDI ANSI X.12 transaction sets that DFAS-Columbus Center has or will be implementing.

a. The Electronic Payment Process at DFAS-CO

"Electronic payments were developed and initiated at DFAS-Columbus Center in January 1990, well before the Electronic Commerce plan was put into effect." [Ref. 18:p. 98] The EC plan and the DMRD 910 consolidation has greatly expanded the use of electronic payments at DFAS-CO.

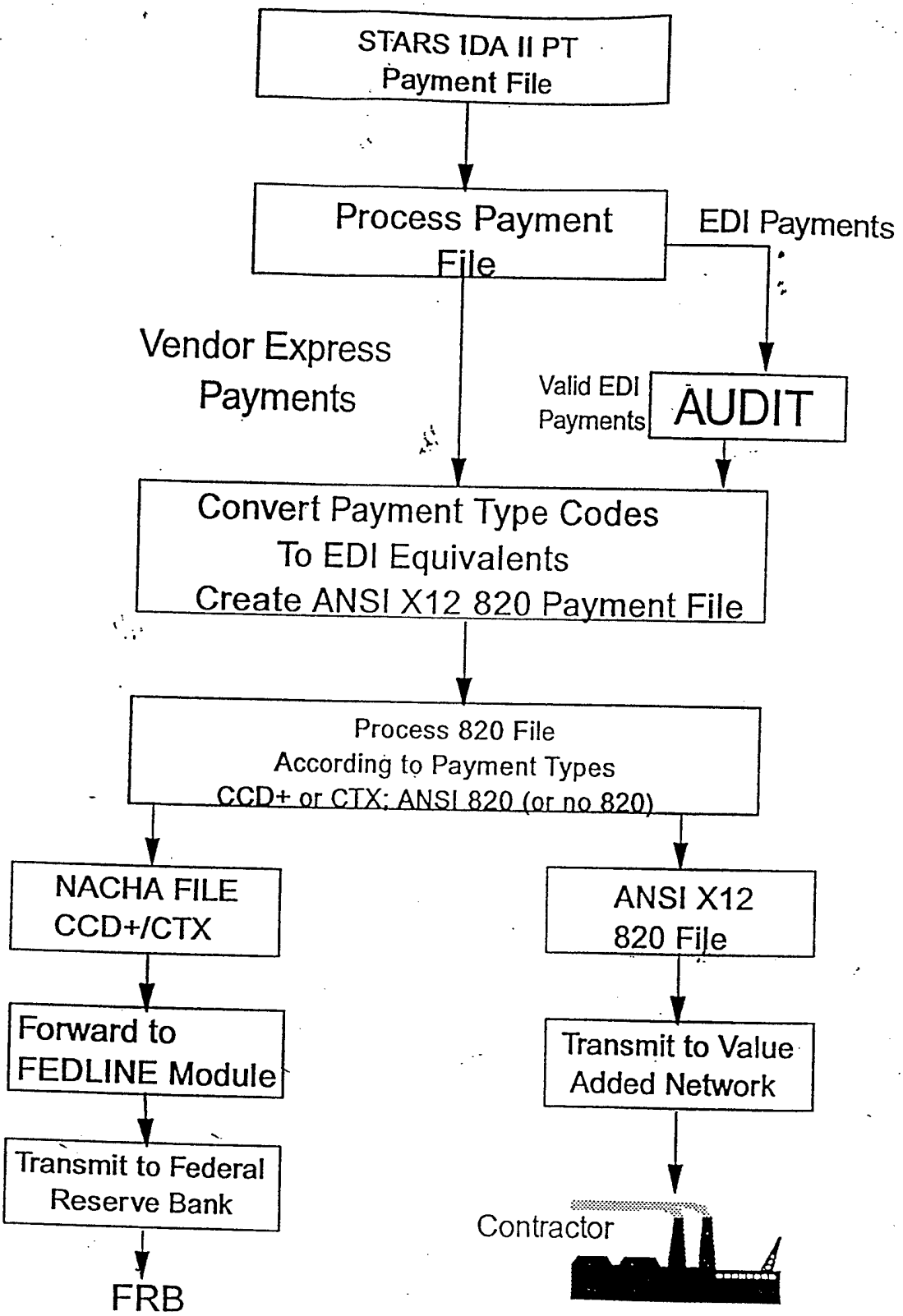


Figure 3.5: SEPS Financial EDI/EFT Process
[Ref.31: p.25]

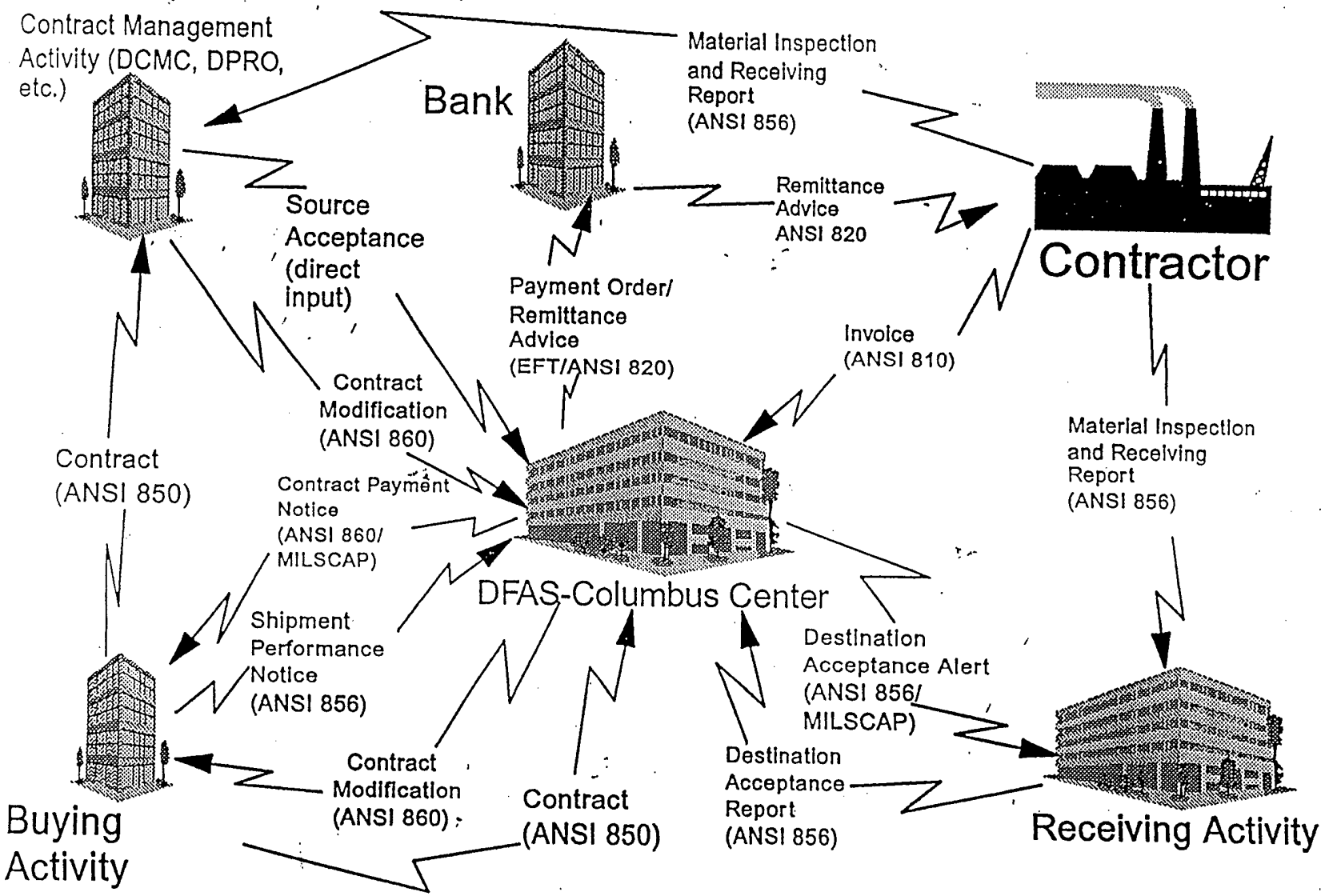


Figure 3.6: DFAS-Columbus Center EDI Plan For CAS Payments
[Ref. 28: Fig. 4-1]

The EFT payment function in MOCAS utilizes the CTX application for payment. [Ref. 33:p. 4] This application permits the use of the ANSI 820 (payment order/remittance advice) transaction set within the CTX application. [Ref. 18:p. 99] The following describes how payments were originally issued with the MOCAS system:

> The ability to choose EFT as a method of disbursement will be at contract (PINN/SPINN) level and not at contractor (CAGE) [Commercial And Government Entry (CAGE) code] level. Routing transit numbers (RTN) or American Banking Association (ABA) numbers and contractors financial institution account numbers will be established at contract level and should be handled as possible remit-to-addresses. [Ref. 33:p. 3]

This description is significant because it points out two concerns about the MOCAS electronic payment process. First, as highlighted in the description above, the MOCAS payments are generated by contract number, not by contractor. This is significant because, "Since payment is by contract number and not CAGE code, multiple payments to the same contractor will be processed individually if not from the same contract." [Ref. 18:p. 99] It is important to note that MOCAS payments have recently been changed to allow for payment by CAGE code. [Ref. 48] The second point concerns the lack of remittance data:

> Electronic payments do not generate remittance data to send to the contractor. All remittance data on the CTX transaction is included in the electronic transmission. This is a major issue for some

contractors, who receive EFT payments but do not receive remittance data from their bank. [Ref. 18:p. 100]

b. Invoice Processing at DFAS-CO

As LT. Smith notes concerning invoice processing:

> The importance of the internal process by which DFAS-Columbus Center performs its data entry, review and audit, approval, and payment functions cannot be overemphasized. Without an accurate, efficient system, the electronic payment at the end of the process could be in error or lead to further errors in the overall pay/accounting cycle. [Ref. 18:p. 101]

To depict the process, and its many possible problem areas, Figure 3.7 provides a diagram of the process.

There are four important points to make about the invoice payment process:

1. Because of the standardized MILSCAP format, for any payment out of MOCAS to be correct, the information flowing in must be accurate and complete.

2. When a contractor signs on for electronic payments, it must do so using a Trading Partner Agreement (TPA). The Federal Acquisition Regulation (FAR) requires that an EFT clause for each contract be included. Consequently, any contractor currently being paid electronically from any Government activity must resubmit its request for electronic payment for each contract. For existing contracts, this requires a contract modification.

3. When the disbursing division of DFAS-Columbus Center generates its daily MOCAS EFT transmission, it is under a tight schedule from the Federal Reserve Bank to get the payment transmission out on time.

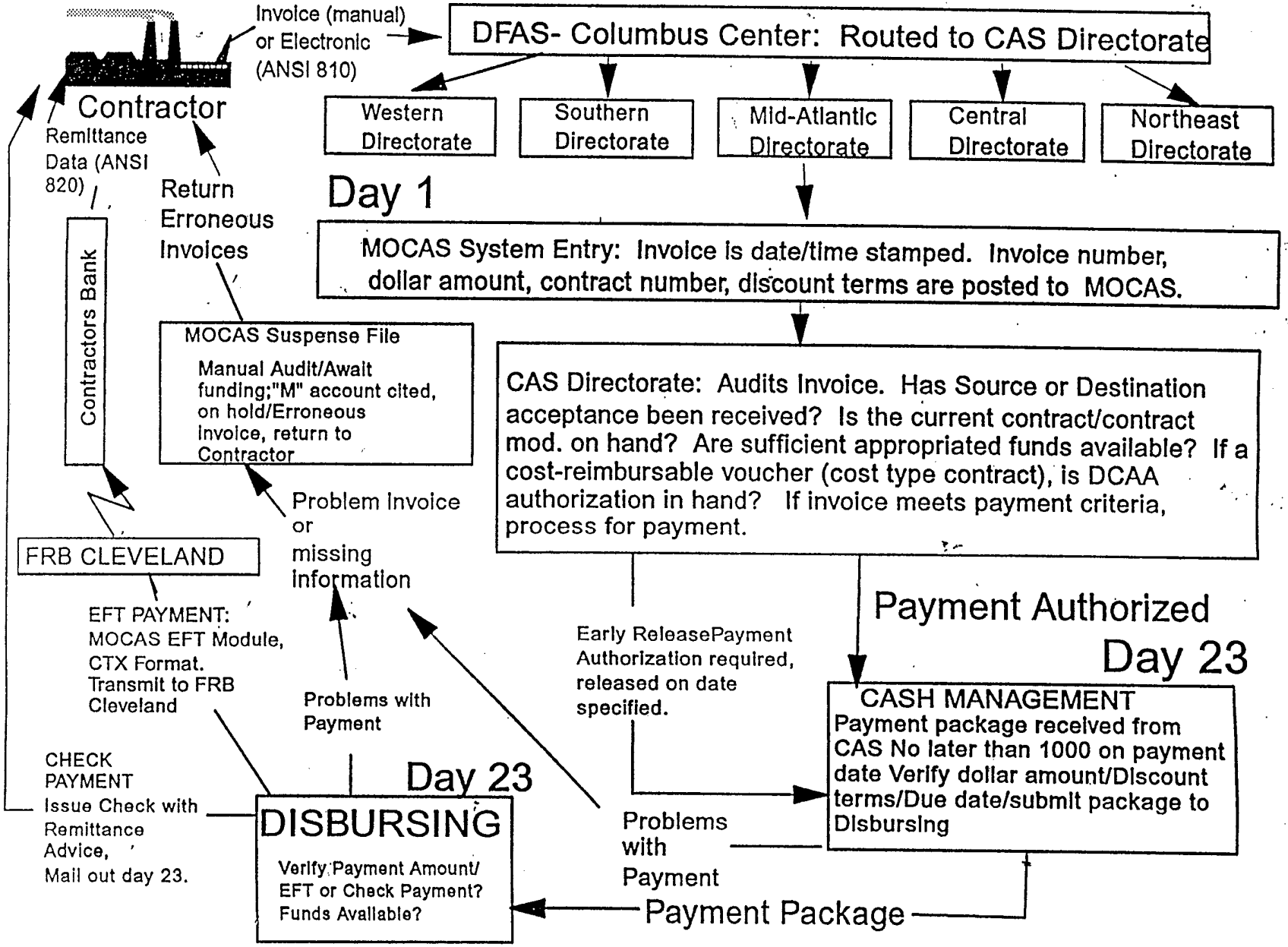


Figure 3.7: DFAS-Columbus Center Invoice Processing Cycle
[Ref. 18:p. 102, Fig. 13]

4. If an EFT payment is rejected by the receiving bank, this sets in motion a series of transactions with the Federal Reserve and labor intensive steps by DFAS-Columbus Center to resolve the problem. [Ref. 18:p. 101-103]

In summarizing the invoice processing system at DFAS-CO, it is important to note the following:

> DFAS-Columbus Center is, by design, an invoice processing factory. The amount of invoice, receipt documentation, and supporting contract information necessary to complete a single pay transaction is immense. If any of that documentation is missing or inaccurate, the payment process is suspended indefinitely until the problem is resolved. [Ref. 18:p. 103]

Fortunately, initiatives are underway to eliminate this inefficient paper flow.

3. The Defense Procurement Payment System (DPPS)

This inefficient paper flow, as well as the multitude of proprietary AISs, is well documented and is currently being addressed by the Defense Procurement Payment System (DPPS) Program Management Office (PMO). The Program, which is currently at Milestone 0, was developed to acquire and deploy an automated information system (AIS) for both contract and vendor payment, and the accounting and disbursement aspects associated. As stated in the Executive Summary of the DPPS Mission Need Statement (MNS):

> Today, we rely on past corporate business practices that are quickly becoming outdated. Among these practices are (1) the use of hard copy documents; (2) rigid policy and procedures; (3) failure to maximize EC/EDI/EFT potential; (4) non-use of

> imaging; (5) non-standard data definitions; (6) failure to integrate our procurement practices; (7) environment which produces duplicate payments; (8) untimely interfaces of key events, e.g., unsubmitted receipts/acceptance documents for good/services; (9) repeat input data; and (10) multiple accounting interfaces. [Ref 35:p. 2]

Obviously, an undertaking of this magnitude will take a long time to employ and be very expensive. The MNS for DPPS states that the DPPS PMO has been authorized 16 workyears for Fiscal Year (FY) 1995 and the estimated costs of the DPPS is approximately $98.2M. [Ref. 35:p. 8] Although, costly in time and money, the projected benefits associated with DPPS appear to make the investment worth it:

- Resolve negative unliquidated obligation issues.
- Reduce overpayments.
- Eliminate the need for validation.
- Prevent unmatched disbursements.
- Provide a new contract payment environment through the use of standard processes, standard shared data and electronic commerce (EC) and electronic data interchange (EDI).
- Improve data management and integrity by electronic input of source data to a shared data repository.
- Replace disparate contract payment systems, subsystems and databases with a single system.
- Establish consistent corporate decision making and increased end-user productivity through elimination of redundancies and hard copy documents.

- Improve cross-functional processes and standard data transfers.
- Improve timeliness and accuracy in contract payment.
- Reduce labor intensive processes, duplicate data entry, and paper handling tasks.
- Ensure capture of up-to-date accurate information resulting in more efficient contract payments.
- Improve workload management.
- Provide greater flexibility for system changes.
- Improve decision support capability. [Ref. 35:p. 6]

The Program Manager, Ms. Christy Rhoads at DFAS-CO, obviously believes that the time and money are worth expending. As she states, "The failure to act on potential benefits [associated with DPPS] will subject DFAS to continued negative attention from Congress, and the public about the agency's inability to reconcile payments and accounting records." [Ref. 35:p. 7]

Ms. Rhoads is convinced that, "The successful development and implementation of DPPS will provide timely and accurate contract payments, and reporting to accommodate respective DoD entities responsible for buying, requiring, and accounting functions." [Ref. 35:p. 1] She goes on to explain:

> DPPS, when implemented with the Standard Procurement System (SPS) and a Shared Data Warehouse (SDW), will provide much needed

> resolution for major issues with negative unliquidated obligations, overpayments, validation, and unmatched disbursements. [Ref. 35:p.1]

Obviously, the realization of projected benefits of DPPS depends on the acquisition and deployment of the SPS.

4. The Standard Procurement System (SPS)

Although SPS is not an electronic payments system, its function, and relation to DPPS, should be explained. This is because, according to the MNS for DPPS, the acquisition and deployment of SPS is essential to the success of DPPS. The SPS project is managed by the Defense Procurement Corporate Information Management (CIM) Systems Center (DPCSC).

SPS is intended to provide for standard processes supported by standard shareable data (Shared Data Warehouse), and a standard automated procurement system with EC capability to replace the multitude of procurement AIS legacy systems and to automate non-automated procurement activities. [Ref. 36:p. iii] SPS's importance to the success of DPPS can be seen in a quote from the MNS for SPS:

> The Defense Finance and Accounting Service (DFAS), under the direction of the DoD Comptroller is responsible for the contract payment function and requires data from the procurement functional area to exercise its responsibilities. Deployment of a standard Automated Information System (AIS) with shared data capability will improve the DFAS' ability to make timely, accurate, contract payments. [Ref. 36:p. 1]

Thus, as can be seen, the success of DPPS relies directly on the success of SPS.

5. The Government Procurement Card

As noted in the *Streamlining Procurement Through Electronic Commerce* final report, ninety-eight percent of Federal procurements are for small purchase material and non-personnel services valued at less than $25,000. These small purchase materials and services are procured normally through repetitive processes from small businesses. Many different procurement and payment methods have been used to procure and pay for small purchase items. These small purchase procurement methods include Blanket Purchase Agreements (BPAs), Imprest Funds, and Purchase Orders. However, primarily because of the likelihood of untimely reimbursement, many merchants balk when asked to accept payment through these methods. [Ref. 58:p. 11]

In September 1986, the Department of Commerce sponsored a pilot program whereby small purchases could be paid for using a Government Credit Card. [Ref. 58:p. 14] The Rocky Mountain Bankcard System (RMBCS) was awarded a contract to provide MasterCard services for this program. [Ref. 58:p. 14] Based on the success of this pilot program, the Office of Management and Budget (OMB) tasked the General Services Administration (GSA) with developing a credit card program for

the entire Government. [Ref. 58:p. 14] In 1989, "The Deputy Assistant Secretary of Defense for Procurement authorized the use of the GSA Government-wide Commercial Credit Card Program by all DoD activities." [Ref. 58:p. 15]

The Government Credit Card is not strictly an electronic payment method, however, the program has greatly reduced the number of invoices being processed by DFAS. Since its inception, the Government-wide Credit Card Program has grown steadily. Based on information provided by GSA, as of April 1996, there are 180,266 agency cardholders conducting 10,145,176 transactions annually. Total agency procurements surpassed $3.6 billion over the period March 1994 to April 1996. Therefore, even though not originally implemented as a payment method, the Government credit card has resulted in significant invoice processing workload reduction for DFAS.

E. SUMMARY OF ELECTRONIC PAYMENTS IN DOD

The OMB has promulgated that, "Federal funds are to be transferred by EFT, or other means identified by the Secretary of the Treasury, whenever EFT or the other identified means is cost effective, practicable, and consistent with current statutory authority." [Ref. 37:p. 1] The OMB explains further that Federal agencies are responsible for adopting processes in order that EFT can become the standard method for payments. Specifically, when addressing vendor payments, the OMB noted,

"Agencies will incorporate in all contracts the EFT payment clause from the Federal Acquisition Regulation, unless a determination is made that it is not in the best interest of the Federal Government to do so." [Ref. 37:p. 3] Additionally, with the recent passage of the EFT Expansion Act, payment via EFT will be mandatory as of 1 January, 1999. Finally, in order to transition to this mandate, all contracts written after 1 July, 1996 will include the payment by EFT clause. Thus, as evidenced by this chapter, DoD is making good progress towards making EFT the method of payment.

The more difficult problem of the EFT/FEDI milestone is the FEDI aspect. The DoD has not made as much progress on this side of the payment cycle. The dual acquisition of DPPS and SPS is an indication that DoD agencies are finally working together to field a fully integrated electronic procurement and payment system. However, since the deployment of these systems is years away, DoD activities must take action in the short term to accomplish the executive mandate of FEDI capability.

The next chapter will offer some lessons learned from private industry and their applicability to the DoD contracting and payment system.

IV. EFT/FEDI LESSONS LEARNED FROM PRIVATE INDUSTRY

A. OVERVIEW

This chapter will present an analysis of data gathered from a literature review of articles about, and interviews with, private industry. Findings will be presented in a format that emphasizes the application of information technology to the payment process and associated lessons learned in private industry. The findings will be summarized in general lessons learned with an emphasis on using those applications that were common, or at least experienced by more than one company. Additionally, applicability to DoD and its unique procurement environment will be considered.

1. Differences Between Private Industry and DoD

Before going further, the inherent differences between the defense industry and commercial industry pertinent to this discussion should be reiterated as a reminder of why acquisition reform is so difficult. These inherent differences may be well known, however, reviewing the reasons this is so will put this discussion about the applicability of private sector lessons learned into perspective:

- There is one buyer--a monopsony--hence no true market;

- For any particular item, there is often only one or at most a very few sellers;
- Performance is difficult to judge, and is often judged subjectively, except for the rare occasions when the nation actually uses military force on a large scale;
- The enterprise operates with public funds, the use of which is held to a different standard than private funds;
- Decision-making power is diffuse, being shared between the executive branch and the legislative branch (with its many committees and subcommittees); and,
- Decisions and operations are conducted in the open, under great public scrutiny. [Ref. 38:p. 190-191]

J. Ronald Fox, in his classic study of defense acquisition, *Arming America,* concluded from these characteristics that, "there is no sensible reason to deny the obvious.... The basic tenets of the free enterprise system do not apply." [Ref. 39:p. 474] As this statement indicates, many, perhaps most, commercial business practices have no application in the defense world. However, as noted in a recent Topical Issues In Procurement Series (TIPS) article, "...in government contracting, the use of commercial practices, specifications, and standards is increasingly being emphasized." [Ref. 40:p. 1] This is nowhere more true than in EFT/FEDI implementation.

2. Private Industry Research

Although lessons learned from private industry implementation of EFT/FEDI are applicable, industry views EC/EDI as a means to gain a competitive advantage. Therefore, many times industry was not as forthcoming with information as the author had hoped. An example of this was the author's attempts to gain information from Wal-Mart. Wal-Mart is considered a leader in the use of EC/EDI and was believed to be a prime candidate for lessons learned. However, the author was given a quick introduction to how important EC/EDI is to Wal-Mart in gaining and maintaining a competitive advantage. During repeated attempts to gain information, the researcher was informed that the company did not divulge any information about its EC/EDI program. This protective attitude was present with most companies I interviewed, and resulted in only general information being released. Therefore, lessons learned will generally be applied from a macro level. Names of companies will be used where permitted, and, otherwise, listed by industry.

B. APPLICATION OF INFORMATION TECHNOLOGY TO THE PAYMENT PROCESS IN PRIVATE INDUSTRY

This section will present several lessons learned from private industry's experience with implementing EC/EDI. The section begins with implementing EC/EDI, because EFT/FEDI implementation is a subset that should not be implemented in

a void. In other words, the application of information technology to the payment function is only one part of a company's overall EC/EDI strategy. This section will eventually then list specific applications to the payment process, but will appropriately begin with the initial implementation of an EC/EDI program.

The author found that the following steps were most commonly taken by forward-looking companies when applying information technology to the payment process:

1. Development of an EC/EDI strategic plan.
2. Senior management consensus and communication.
3. Re-engineering of the payment process.
4. Selection of financial service provider.
5. Application of information technology.
6. Communication with vendor base.

Most successful companies performed these steps sequentially, except steps two through six were often overlapping and conducted simultaneously. Lessons learned from private industry will now be presented based on these findings.

1. EC/EDI Strategic Planning

Today's financial managers understand and agree that doing business electronically makes fiscal sense. Unfortunately, most organizations are used to and are designed to move paper. Most have a mail room manager, but few have an

electronic mail room or Local Area Network (LAN) manager. Few have someone capable of coordinating and prioritizing receipt of electronic invoices and electronic remittance advices, or training staff to understand that the "check is in the mail" no longer describes payments in an era of EFT. Fewer still have someone capable of making EC the standard operating procedure. However, with a proper EC/EDI strategic plan, these organization and staffing needs can be met.

This necessity to have an EC/EDI organizational strategy as the first step in any EC/EDI implementation was echoed throughout private industry. The accomplishment of strategic EDI planning was elaborated on by several industry representatives in a recent *Northern California EDI User's Group Newsletter:*

> Strategic EDI planning should be coordinated through a central organization because EDI is cross-functional and can affect more than one department. Tactical implementation should be handled by decentralized departments because they are closer to the actions and best understand their own needs. The role of the central EDI organization is to provide a consistent approach to implementing EDI by developing a corporate EDI vision and strategy. Successful EDI companies like GE, DuPont and Texas Instruments have centralized their EDI support. Others without central EDI direction have struggled. The hardest part is achieving a balance whereby the centralized function best leverages the corporate investment and the departments maintain the autonomy needed to meet their business objectives. [Ref: 42:p. 1]

It was specifically noted that the purpose of an EC/EDI organizational strategy was to structure the nontechnical requirements in an organization. The challenge for managers of EC/EDI will be to design jobs suitable for doing business tomorrow. To do this successfully, support for EC/EDI must start with a consensus from senior management. Finally, the strategic plan needs to be communicated to all those affected by this new direction.

2. Senior Management Consensus and Communication

Many industry representatives echoed the statement that this senior management consensus will create a clear and common focus for the adoption and implementation of EC/EDI. Staff education is especially necessary to create significant change within an organization. People affected by change need to know the nature of the change, how it will occur, its impact, and their role in the process of change. People often do not object to change as much as they object to being changed. Their participation, acceptance, and active assistance are the desired ends of an EDI-educational program.

According to a recent study conducted by the Strategic Computing and Telecommunications Program at Harvard's John F. Kennedy School of Government, there is a large information technology knowledge gap between general managers and lower-level managers and employees. The study goes on to explain

that in rapidly changing environments, front-line and senior managers need to become aggressively involved in providing the right amount of information technology related learning for individuals and teams. [Ref. 59:p. 4A] Many in the procurement community are hesitant to try new acquisition methods such as EC/EDI. However, many employees have been waiting for a signal from above that it is okay to try new acquisition methods. Private industry views senior management consensus and communication as the opportunity to signal the new change.

3. Re-engineering the payment process

Re-engineering existing business processes can result in dramatic improvements in efficiency and productivity. Re-engineering is one of the most powerful tools available to corporations today. Mike Hammer, of Hammer and Associates, defines re-engineering as "fundamental rethinking and radical redesign of business processes to achieve dramatic improvements in critical, contemporary measures of performance, such as cost, quality, service, and speed." [Ref. 43:p. 10] Although many companies have re-engineered their payment process, R. J. Reynolds Tobacco Company (RJR) in Winston-Salem, N.C., a subsidiary of RJR Nabisco, has been one of the most successful.

RJR's re-engineering efforts began in late 1990. The company's payment process had been developed to support an outdated paper-based society, not today's information based business environment. [Ref. 43:p. 10] In planning to re-engineer its payment process, RJR described its mission as not just automating the old process, but obliterating it. RJR began its re-engineering process by forming a payment team consisting of personnel from various payment functions. They believed this was a critical step since implementation of EC/EDI is a cross-functional process affecting the entire company. The team's goal was to eliminate noncritical tasks that did not add value to the payment function. Critical to their success was the hands-off approach taken by management. The payment team was empowered to seek creative solutions to the problems within the payment process. [Ref. 43:p. 11]

One of the key lessons learned from re-engineering business processes is to re-engineer the process prior to applying any information technology to the process. This will enable all non-value added steps to be identified and removed from the process vice simply automating an inefficient process. This step was key to the success of re-engineering at RJR. Prior to commencing the re-engineering effort, they developed a 17-page flowchart of individual payment decisions required in the payment process. [Ref. 43:p. 12] By the time

they were finished eliminating processing bottlenecks and redundant steps, the final re-engineered payment process had been reduced to two pages. [Ref. 43:p. 12]

After RJR had re-engineered the payment process, they applied information technology to the process. [Ref. 43:p. 13] Because RJR had made a commitment in 1987 to conduct business with its suppliers using EDI, expansion to use of the EDI invoice was a natural step. For RJR, "Eliminating paper invoices and excessive transaction routing was a major breakthrough in re-engineering the payment process." [Ref. 43:p. 14] However, this was not an easy step to take. Many of their vendors were still submitting paper invoices. Therefore, RJR mandated that if a vendor wanted to continue to do business with RJR, they must submit payment requests by EDI invoices. As noted by RJR, "The expanded use of high quality EDI invoices allows RJR to process payments accurately and on time, eliminating payment delays and errors due to excessive clerical handling. EDI has automated the paper invoice transaction by converting paper to EDI invoices." [Ref. 43:p. 14]

The next step in re-engineering the payment process at RJR was to eliminate the invoice altogether. To do this they implemented Evaluated Receipts Settlements (ERS), which will be discussed in more detail later. This is the concept of

paying for material received from a supplier without an accompanying invoice. As RJR notes,

> ERS eliminates excessive paper handling and routing of invoices for payment approvals. Billing errors are eliminated and vendor payments are timely and accurate. The ERS payment process places the burden of accountability on the requisitioner and buyer to create and maintain purchase orders in a timely and accurate manner. [Ref. 43:p. 15]

RJR has succeeded with both re-engineering of its payment process as well as with the application of information technology to the re-engineered process. They attribute their success to the steps noted above and the application of lessons learned along the way. Illustrative of their success is their summation of the re-engineering effort:

> Innovative payment solutions and operating efficiency have significantly reduced and, and in some cases, even eliminated traditional paper based payment processes. Although our transaction volume has increased by 16 percent annually, clerical staffing requirements have been reduced by 25 percent. Re-engineering has reduced our invoice processing costs by 53 percent. The traditional paper-based system has been reworked from the ground up with re-engineered payment solutions that are helping RJR meet the business challenges of today and tomorrow. [Ref. 43:p. 19]

The lessons learned from RJR's experience with business process re-engineering are especially applicable to DoD's payment process. DoD also has a payment process that has been developed to support an outdated, paper-based society, not today's information based business environment.

4. Selection of Financial Service Providers

This step in the process is key to both the buyer and the vendor. Additionally, it applies to the implementation of both EFT and FEDI. This step is so critical because not all vendors are comfortable with EFT and not all banks are EDI capable. As noted in discussions with Jim o'Malley, Financial EDI Manager for Motorola's Land Mobile Products Sector (LMPS):

> Motorola would like to see all of our vendors receiving EFT payments. The resistance comes in two forms, one is people who are nervous about electronic funds and the other form, which is more prevalent, is the banking institution they are dealing with. The bank is not a FEDI bank or they do not have a good delivery process for electronics to their customer base. The banks who are not FEDI capable are charging more money to process electronic information. The remittance data is the key stumbling point for these banks. [Ref. 45]

Mr. O'Malley's comments are echoed throughout industry and supported by statistics provided by the National Automated Clearinghouse Association (NACHA). Currently, only 1031 of the less than 11,000 commercial banks in the U.S. are EDI capable. [Ref. 46]

Searle, a Chicago-based pharmaceutical manufacturer, has become a FEDI leader within its industry. Company officials attribute this success to the fact that the company made a concentrated effort to develop a FEDI bank selection strategy and implemented it successfully. [Ref. 6:p. 11] Searle's first step was to put together a team of experts. The team

defined its parameters and surveyed the landscape to identify potential financial service providers. Searle then sent 12 qualified banks questionnaires to assess the banks' general FEDI capabilities. After eliminating five candidates immediately, the remaining seven provided presentations and references. The team then applied a weighted set of criteria to narrow the field to three. The criteria included marketing support, audit controls, references/performance, resources, location and EDI/EFT product knowledge. The final selection was based on visits to the individual banks. Searle's experience with selecting a FEDI capable bank was time consuming, but well worth the effort. Today, over 75 percent of their trading partners send trade receivables electronically and enjoy the many benefits of FEDI. [Ref. 6:p. 12] As can be seen, the selection of a financial service provider is critical when implementing FEDI.

Over the past three years, a number of U.S. banks have organized a cooperative effort to develop a national EC network known as EDIBANX. [Ref. 47:p. 22] EDIBANX was formed to provide commercial customers of member banks electronic access to commercial customers of other member banks. This is significant because EDIBANX expands the electronic reach each bank can deliver to its customers because there is now the

potential to send and receive all transactions electronically. [Ref. 47:p. 22] An EDIBANX transaction is described as follows:

> With an EDIBANX transaction, the payment and the remittance information flows together electronically from the customer through its originating bank and on the network. The network routes the payment and remittance data to the supplier's participating bank. That bank posts the payment to the receiver's account and forwards the remittance information in a predefined format to the supplier for use in updating accounts receivable records. [Ref. 47:p. 22]

The EDIBANX Trading Partner Directory represents 5,000 companies currently. [Ref. 47:p. 22] This number is expected to grow as additional banks join EDIBANX. This is significant to DoD because DoD's trading partners may be joining this organization. If so it is crucial that DoD understand how it works and the interaction with DoD systems.

5. Application of Information Technology

As noted in the introduction to this section, steps three through six were sometimes conducted concurrently. Some overlap naturally occurs when you consider that a company's re-engineering process evolves to include an understanding of current information technology, financial service provider capabilities and vendor capabilities. Therefore, the steps listed so far have referred to many information technology applications. Current uses of this information technology in private industry will now be discussed.

a. Electronic Funds Transfer (EFT)

The author started out this research to find lessons learned from private industry that could be applied to DoD's implementation of EFT in order to expand its usage. However, it quickly became apparent that DoD had already decided on EFT as the preferred method of payment, and was leading the way in its use. As noted in ACH statistics provided by NACHA, greater than 20 percent of the approximate 2.9 billion EFT transactions were generated by the Government. The remaining 80 percent were generated by the other 500,000 companies using the ACH network. [Ref. 49]

This desire to use EFT became even more evident when the President signed the landmark Electronic Funds Transfer Expansion Act in April 1996. As noted earlier, this law mandates that all Federal payments, except IRS tax refunds, be issued via EFT by January 1, 1999. Based on this mandate, the Federal Government realizes the cost savings associated with EFT usage and is going full speed ahead to implement.

Now the challenge becomes marketing EFT to DoD's vendor base. This challenge was noted by Regina Shrigley, customer service representative in the DFAS-CO EFT section. DFAS is adjusting to this new mandate and has thus far directed that the law will not be used to force vendors to sign up for EFT. However, it will be used as incentive to get

vendors signed up as soon as possible. Because, as Ms. Shrigley noted, they have thousands of vendors to sign up between now and 1 January 1999. [Ref. 48]

When private industry marketed EFT to its vendors, they found that resistance to electronic payments came in two forms. First, there are the vendors who are nervous about technology and electronic funds. Second, there are the vendors that are concerned about the loss of remittance data. Although the second form of resistance was more prevalent, the first form of resistance was just as important to deal with.

When private industry began to analyze these two forms of resistance, they came to realize that they are interconnected. In other words, while marketing the many benefits associated with electronic funds, private industry realized the resistance to new technology was directly related to the vendor's fear of losing remittance data. This lesson was not lost on private industry and, thus, the emergence of FEDI in order to provide an electronic funds format that would allow the payment and remittance data to flow together.

b. Financial Electronic Data Interchange (FEDI)

FEDI, moving the payment and remittance detail together electronically, has proved to be more difficult than the implementation of EDI alone. However, the recent trend in industry has been to move in this direction for electronic

payments. As noted by NACHA, FEDI growth has almost tripled in the last five years. FEDI transmissions, ANSI X12 820, have grown from 8.2 million in 1991 to 22 million in 1995. [Ref. 49]

As noted earlier, another major obstacle that both DoD and industry are experiencing is the lack of EDI capable trading partners. The author found that there were two methods employed to overcome this obstacle, mandated usage and usage encouragement. For instance, Wal-Mart simply lets a vendor know, EDI is how we will be conducting business. Other companies, such as RJR, provided information, training, and monetary assistance to get vendors EDI capable. Regardless of the methods used to encourage EDI use, private industry realizes that more trading partners must become EDI capable to promote FEDI growth as well as implementation of other key EDI capabilities.

c. Electronic Invoice

Private industry has found that when they have implemented EDI or are trying to apply information technology to the payment process, the electronic invoice is a natural progression. Most companies the author interviewed were using electronic invoices or experimenting with their usage. Receipt of manual invoices and re-keying invoices into the companies accounts payable system was costly and time

consuming. This sentiment was echoed by Mr. Keith Bowman, a member of the EC/EDI Program Management Office at DFAS headquarters: "Keying invoice information into DFAS' payment system is one of the most time consuming activities, let alone one of the areas where data entry mistakes are most likely to occur." [Ref. 50]

By using electronic invoices, this time consuming process of entering a manual invoice into the accounts payable system and matching it up with a receipt document could be eliminated. Companies benefit because of labor savings and an increase in timeliness and accuracy of payments. Vendors benefit likewise through increases in timeliness and accuracy. Additionally, they benefit because their electronic invoice is easier to match up in their accounts receivable system.

Vendors are also aware that mailing manual invoices delays their payment. Therefore, a lesson learned from industry is to use this information to encourage vendor use of electronic invoices. By explaining the time savings associated with use of electronic invoices, most companies are able to convince their trading partners to move towards electronic invoice usage. Of course, there is the old standby to mandate electronic invoice usage.

d. Evaluated Receipts Settlement (ERS)

ERS is an application of information technology that would completely eliminate the invoice. ERS was first developed by the automobile industry as a payment method, without the use of invoices, between the automotive original equipment manufacturers (OEMs) and their suppliers. When employing ERS, the dollar amount of the payment is based on a calculation of the quantity in the customer's receipt record multiplied by the price on the purchase order. [Ref. 4:p. 38] Figure 4-1 illustrates the ERS flow of data, product, and funds.

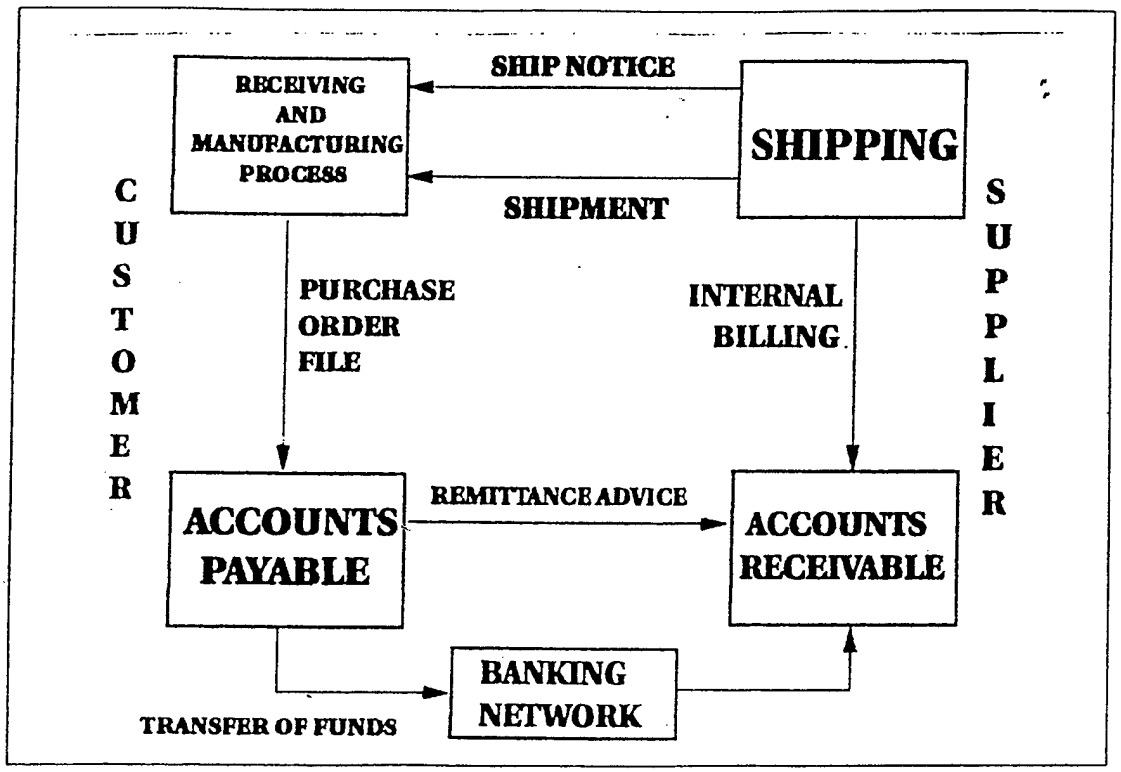


Figure 4.1: ERS data, material, and funds flow
[Ref. 41:p. 36]

The success of ERS implementation is dependent on very strong trading partner relationships. This is evident in the fact that the trading partners must come to an agreement on pricing information and communicate this information so that the price files begin in synchronization. This need for a strong trading partner relationship is further evidenced by the steps involved in a typical flow of information and material in an ERS payment process:

1. First the OEM transmits a release schedule via EDI to supplier requesting specific quantities of material.

2. The supplier then prepares material for shipment, prepares the associated paperwork, and loads material on the truck for delivery.

3. Next, the supplier records sale to OEM at the time material is shipped.

4. Lastly, the supplier transmits EDI shipping notice (ANSI 856) to OEM within 30 minutes of material leaving the plant. [Ref. 41:p. 37]

The next steps in the process involve the OEM processing the shipping notice and receiving the material:

> Relevant data from the shipping notice is validated and recorded in two different departments of the OEM. The Material Control Department validates the receipt records and is responsible for the following information: supplier, part number, unit of measure, and quantity received. The Purchasing Department maintains the required price data and is responsible for the following information: supplier, part number, unit of measure, and unit price. [Ref. 41:p. 38-39]

The OEM's ERS system will then automatically match the data from the two departments with the information provided by the supplier in the shipping notice. [Ref. 41:p. 39] The shipping notice contains the part number, quantity, Shipment Identification number (SID), purchase order number and vendor identification. [Ref. 41:p. 37] Once the shipment arrives at the OEM, the following actions take place:

1. Receipt personnel will enter the SN (Shipping Notice) in the computer and visually inspect the container received against the SN.

2. The receiving personnel then will enter a record of receipt in the computer showing the results of the inspection.

3. The OEM's ERS system posts a payable liability, due for payment at the required time.

4. An ANSI 861 (receiving advise) is transmitted to the supplier notifying them of the results of the receipt inspection. (Ford sends an ANSI 861 to the supplier for every shipment. Chrysler and GM only send an ANSI 861 if the inspection uncovers a discrepancy.) [Ref. 41:p. 37]

The last step in ERS involves the actual payment for the material:

> This step can be done electronically as with EFT/FEDI or by simply mailing a check to the supplier. Using the ANSI 820 (remittance advice), GM sends funds electronically to the supplier. Ford usually pays by paper check but will use the ANSI 820 if the suppliers are capable of receiving it. [Ref. 41:p. 40]

Studies show that a large segment of the automotive industry is today either using or planning on using ERS. [Ref. 41:p. 39] Additionally, use of ERS has spread to other industries as well. For example, Federal Express (FEDEX) is now currently using "Evaluation Receipt Processing" to pay its vendors without the need for an invoice. These highly successful companies see the use of ERS between themselves and their trading partners as a win-win situation. But again, a win-win situation that is heavily dependent on long-term relationships and EDI being adopted by many more businesses.

e. Procurement Cards

As noted by the information and statistics presented in Chapter III, the procurement card is widely used by DoD. Private industry, as well, has learned that procurement cards can slash costs associated with purchasing and accounts payable administration. According to a survey conducted by Strategic Financial Partners (SFP) of Ann Arbor, Michigan, more than 60 percent of Fortune 500 firms use procurement cards. About 42 percent of those surveyed began using procurement cards over the last 12 months, while 25 percent began using the cards in the past six months. [Ref. 51:p.3] During implementation of these procurement card programs, private industry has learned a couple of lessons that could be of significant benefit to DoD's procurement card program.

First, it is well acknowledged in industry that the procurement card is a time saver. It reduces the number of invoices being handled and greatly speeds up the payment process. According to the SFP survey, procurement cards are helping firms slash, by up to five percent, costs associated with purchasing and accounts payable administration. [Ref. 51:p. 3] However, as Susan Rapp, vice president of PNC Bank in Pittsburgh, Pennsylvania, notes, it is a mistake to believe that purchasing cards will replace the company's purchase order and invoicing system. [Ref. 51:p. 2] Ms. Rapp goes on to explain that companies that re-engineer their procurement process before using the cards get quicker payback on their purchasing card program. This would include reevaluating their monthly ledger reports, implementing purchasing cards alongside existing EDI systems, and reviewing vendor relationships. [Ref. 51:p. 2]

The second important lesson learned concerns reevaluating the monthly reconciliation of the bank card statement. A paper report is still provided by the issuer of the procurement card. That paper statement must then be entered into the company's payment system to reconcile their books. As evidenced in statistics provided by the Naval Postgraduate School's (NPS) Supply Department, DoD is also inefficiently dealing with this paper statement. That is

because NPS must reconcile the paper statement and then forward it to DFAS-Charleston. Then DFAS-Charleston must manually enter the statement into its payment system. This process is currently costing DoD hundreds of thousands of dollars in interest charges because DFAS is not paying its procurement card bills within 30 days. Just as private industry is experimenting with having its bank card company provide some form of electronic bank card statement, so should DoD.

f. Shared Data Warehouse (SDW)

Data warehousing is a burgeoning corporate trend. An SDW allows a company's employees to more quickly and easily access their company's rich storehouses of information. Fortune 100 companies realize that this speed in information retrieval allows them to become more competitive. This commitment to development of an SDW was reflected in a recent survey conducted by The Meta Group, a Boston-based market-research firm. In their survey, The Meta Group found that 95 percent of the Fortune 100 is planning to implement a data-warehouse strategy within the next 18 months. [Ref. 44:p. 5]

An SDW is critical to companies that are moving towards a fully integrated procurement/payment system. As indicated in Chapter III, this is the direction that DoD is

taking with SPS and DPPS. An SDW in this case would give the payment function timely access to procurement actions. As noted in discussions with TRW, a defense contractor, most incorrect payments received were due to contract modifications. [Ref. 52] Unless the payment function is aware of the multiple contract modifications in a timely manner, incorrect payments will continue to be a problem. Therefore, as private industry has learned, selection of an SDW will be critical to the success of a fully integrated procurement/payment function.

6. Communication with Vendor Base

Although listed last, this step was probably introduced early in the re-engineering phase. Since good trading partner relationships are essential to process improvement, early involvement of the vendor base was seen as critical. Feedback on vendor impressions and capabilities directly affected the re-engineering process and especially the speed at which information technology could be applied. Re-engineering the payment process or applying technology information without communicating with your vendor base was not practiced.

DoD has done a good job of marketing its intention to move to EC/EDI as the preferred way of doing business. However, signing up vendors and getting them to use EC/EDI has progressed slowly. According to Jim Anderson of the San

Antonio Electronic Commerce Resource Center, only about 2,000 of DoD's 340,000 vendors have registered for EC/EDI. That is a minuscule one half of one percent. [Ref. 53:p. 15] As can be seen, DoD must do a better job of marketing EC/EDI's benefits if EC/EDI is to become a reality.

C. SUMMARY OF LESSONS LEARNED FROM PRIVATE INDUSTRY

Private industry has come to realize that electronic payments not only save money, but they can also greatly improve the timeliness of payment information. As evidenced by this research, the electronic payment process itself is well established through both the ACH and FEDI applications. Therefore, most of the lessons learned associated with the implementation of EFT/FEDI in private industry do not involve the electronic payment process itself. Rather, the lessons learned involve the processes before and after the electronic payment transmission.

This chapter discussed some of the lessons learned associated with actions taken before and after the electronic payment transmission. Applications of information technology to the payment process were presented to demonstrate that true improvement in paying invoices accurately on time must come from improvements in the processing of invoices or reduction in the number of invoices processed. This was demonstrated by examples of how industry is automating the invoice (EDI

invoices), eliminating the invoices (ERS), and restructuring procurement/payment methods (procurement cards).

DoD as well is interested in the money savings associated with electronic payments. Additionally, DoD is interested in making timely payments through the electronic payment process. However, since DoD is restricted in its ability to pay invoices early, it must concentrate on the actions taken before and after the electronic payment to ensure timeliness and accuracy. This chapter has identified solutions to some of those problems. Chapter V will present conclusions that have been drawn from the information gathered. Additionally, recommendations to improve the EFT/FEDI program in DoD will be presented.

V. CONCLUSIONS AND RECOMMENDATIONS

The objective of this research effort was to explore the current state of EFT/FEDI implementation in DoD. An overview of EC/EDI, which recounted the history and Federal direction of EC/EDI, was presented. Next, the current status of EFT/FEDI in DoD and private industry was presented. Next, lessons learned from private industry concerning EFT/FEDI implementation were presented and analyzed for application to the DoD. Finally, this chapter details conclusions and recommendations based on the information presented in the previous chapters.

A. CONCLUSIONS

Conclusion 1. Lessons learned from private industry's use of EFT/FEDI are applicable to DoD's contracting environment. Even with the substantial differences between private industry and DoD's contracting practices, commercial business practices used for the electronic payment process can, and should, be adopted. This conclusion is evidenced not only by research conducted by the author, but also in the 1996 DFAS Strategic Plan. The Plan specifically notes that, "Business practices of American industry and other successful public and private organizations, as well as those advocated by educational institutions, will be continually reviewed to

ensure that DFAS is using advanced finance and accounting business techniques." [Ref. 54]

Conclusion 2. DFAS' 1996 Strategic Plan is well written and forward looking. The Plan supports initiatives driven by and consistent with the goals and objectives of the Secretary of Defense, including his Financial Management Reform initiatives and the DoD Chief Financial Officer Financial Management 5-year plan. The DFAS Strategic Plan is also supportive of higher level programs such as the NPR. Furthermore, DFAS recognizes and acknowledges that defense financial management is a very complex process, and achieving reform is equally complex. This need to adapt to change was aptly noted in the Strategic Plan's Message from the Director:

> The [financial management] environment is constantly changing, and dynamic plans must react to this constant change. Because of this great complexity coupled with constant change, DFAS has created a dynamic, automated Strategic Business Plan capable of rapid reaction to changes in the environment. While DFAS' strategic direction, as shown in this strategic plan, is relatively fixed, the details of how we will achieve our goals are not. [Ref. 54]

Conclusion 3. Senior management in DoD has done a good job of deciding on the future direction of reform of its financial management systems and practices. They have recognized the need to overcome decades-old problems in financial management systems and the need to meet sharply lower budget levels. Additionally, the need to fundamentally

redesign the way Government works in this area has been recognized and promulgated. However, this senior management consensus does not appear to have been directed towards mid-level management and lower level employees. This is based on the need to address resistance to change and real or perceived threats to future employment.

Conclusion 4. The application of information technology to the payment process should not be done prior to re-engineering the payment process. This statement was echoed throughout industry and was cited as one of the main reasons businesses were not reaping all potential benefits from their EFT/FEDI programs. To apply information technology to the payment process prior to reengineering is simply automating an outdated, inefficient system. The purpose of implementing EC is not solely for the cost savings, but, more importantly, to enable the organization to perform its business and mission more effectively.

The purpose of process reengineering is to emphasize the review of all steps involved in a business process. Then, to analyze each step looking for areas to remove or consolidate in order to improve effectiveness and efficiency. Currently the procurement/payment process in DoD is time consuming and labor intensive. Even with the initiatives taken to automate the payment process through EFT/FEDI, the process involves

steps that are redundant, are non-value added, and are costly. Therefore, this researcher concludes that the procurement/payment process within DoD should be reengineered before more money is spent applying information technology to an outdated system.

Conclusion 5. As part of the re-engineering effort of the payment process, DoD should accelerate usage of EDI invoices. Electronic invoices are used extensively throughout industry and are a natural progression for DoD's trading partners who are already using EDI.

Conclusion 6. The requirement to have an invoice prior to making payment to a vendor should be eliminated. Process reengineering using EDI procedures would allow for elimination of the invoice. Following industry's lead with the use of ERS, the vendor could now be paid using receipt acknowledgment reports. Elimination of the invoice would simultaneously eliminate much of the work associated with the invoice. Time and effort now devoted to mailing, receiving, and processing invoices could be devoted elsewhere. Elimination of the invoice would tremendously improve DoD's ability to pay the vendor on time.

Conclusion 7. The procurement card program has been well received by the vendor community, but has achieved varying results for the procurement/payment community. Most vendors

enjoy the benefit of getting paid within 48 hours of depositing their charge slips. However, even though the credit card has reduced the number of invoices DFAS has to process, it has resulted in an administrative workload increase in the reconciliation process. This is basically due to the fact that the credit card program was simply superimposed on an antiquated system.

Conclusion 8. DoD needs to continue to pursue a fully integrated procurement/payment system through the acquisition and deployment of SPS, DPPS, and an associated SDW. The acquisition of these commercial AISs should ensure that DoD is able to make the "quantum leap" from a paper-based system to a true EDI, paperless with no human intervention, system. However, the author reiterates that this "quantum leap" will not happen simply by applying information technology to an outdated procurement/payment process. This "quantum leap" will only be accomplished after several "minor" leaps have been taken.

Conclusion 9. DoD receives various types of resistance from its vendor base when attempting to implement EC/EDI. DoD needs to improve communication with its vendors concerning the benefits of EC/EDI and EFT/FEDI. The slow pace of EC/EDI acceptance by DoD's vendor base is delaying DoD's ability to move forward with EC/EDI implementation. This lack of

communication is directly related to the number one reason cited by vendors for why they do not sign up for EFT; lack of remittance data. To this end, DoD has failed to communicate the various means by which a vendor can receive remittance data. Since DoD cannot make EC/EDI a reality without its vendor's cooperation, it is critical that DoD make every effort to communicate the many benefits associated with the use of information technology. EC/EDI growth in this nation will be greatly accelerated by Government use.

Conclusion 10. The terms and conditions of the Prompt Payment Act serve as an impediment to the expansion of EFT/FEDI. DoD is restricted by when it can make payment to a contractor. The vendor community realizes this fact and is not incentivized to offer the discounts that were available prior to passage of the Prompt Payment Act. To fully reengineer the payment process, consideration will need to be given to changing the terms and conditions of the Prompt Payment Act.

B. RECOMMENDATIONS

Recommendation 1: DoD should continue to benchmark their electronic payment process against private industry processes and adopt those processes that apply. DFAS has set an excellent precedent by conducting information exchange meetings with FedEx and Motorola. DFAS should expand these

meetings to include more companies and more personnel. Specifically, the author would recommend that at least one member of the DLA Emerging Technology Integrated Product/Process team (IPPT) be included in the information exchange. This would greatly increase the communication between DLA and DFAS. Additionally, the IPPT member would be able to introduce private industry lessons learned to the ongoing efforts of the IPPT.

Along this line of bench marking, recommend that DFAS/DLA not only benchmark private industry but, other Federal and Defense Agencies as well. Many Federal and Defense Agencies have had tremendous success implementing EC/EDI and electronic payments. These agencies include, but are not limited to, the Veteran's Administration (VA), the Defense Personnel Support Center (DPSC), the General Services Administration (GSA), and the National Aeronautics and Space Administration (NASA). Bench marking against these other successful Federal and Defense Agencies should provide many more applicable lessons learned. This can be attributed to the fact that these agencies are subject to a contracting environment similar or identical to that of DoD.

To aid DoD in its Bench marking efforts, it is further recommended that DoD use commercially available FEDI surveys. The EDI Group conducted a survey of 500 FEDI users or planners

from Fortune 1,000 companies and their customers and suppliers in September 1995. The purpose of the survey was to assess the plans of companies using or planning to use EFT/FEDI. This survey was to help develop a comprehensive picture of the need for and quality of financial services being delivered to the EFT/FEDI market. The cost of the survey's results was beyond the author's financial resources. However, the survey's results might be beneficial enough to DoD to warrant the expense, or, DoD might even be able to obtain a complementary copy.

Recommendation 2: Recommend that DFAS expand its next revision of its Strategic Business Plan to include a separate section addressing EC/EDI initiatives. Although the plan currently includes mention of EC/EDI and information technology, it is only addressed in very general terms. An objective as difficult as adopting EC as the standard operating procedure at least justifies a separate section in the plan if not a separate EC/EDI strategic plan altogether.

Along this line, the author recommends that DFAS follow private industry's lead and develop a separate EC/EDI strategic plan. As the author's research indicated, a central EC/EDI strategic plan will provide a consistent approach to implementing EC/EDI. This plan would help to focus and centralize the EC/EDI expertise within DFAS. Additionally,

this plan would provide DoD's trading partners with a consistent plan for the future of the electronic payment process.

Recommendation 3: Recommend that senior management at DFAS expand the use of their Internet Web site, DFAS Lane, to communicate future EC/EDI initiatives to their customers and employees. This would follow industry's lead of addressing the cultural change associated with, and the necessity to stay competitive in, the constantly changing world of information technology. As industry noted, staff education is especially necessary to create significant change within an organization. Additionally, when EC/EDI is involved, vendor education will also be critical.

Along this line, it is recommended that DFAS expand its communication efforts established by its EC program office and EC/EDI offices at its regional locations. Communication about EC/EDI initiatives could be enhanced by two methods. First, through the use of an intranet, an internal employee communication network. Second, communication could be improved through the establishment of a central EC/EDI help desk. Both of these initiatives have been used in industry resulting in improvement of both internal and external communication.

Recommendation 4: Recommend that DoD benefit from lessons learned from private industry by reengineering the payment process prior to applying information technology. It is well documented throughout industry that applying information technology to the payment process prior to reengineering is simply automating an outdated, inefficient system. Although listed fourth, the author strongly recommends that re-engineering the payment process should be DoD's number one priority in financial management reform.

Along this line, recommend that DFAS move quickly forward with the business process reengineering initiatives listed in its Strategic Plan. These initiatives have been incorporated into the developmental activities associated with the DPPS initiative. This is a pioneering step by DFAS to ensure the payment process has been modernized by the PMO prior to acquiring and deploying the AIS. Recommend that the DPPS PMO follow industry's lead and develop a payment process flow chart to eliminate redundant or non-value added steps.

Recommendation 5: Recommend that DFAS continue its efforts to implement the use of EDI invoices. As noted, DFAS has only recently begun to receive EDI invoices. Currently, a one-year trial period is used with a vendor before going completely to electronic invoicing. Recommend that when DFAS

becomes more accustomed to using electronic invoices that the test period for implementation be shortened.

Further, recommend that DoD follow industry's lead and eventually mandate that trading partners use EDI invoices. This could be part of the TPA and could be linked to receiving payment via FEDI. Optionally, DoD could heavily encourage use of EDI invoices by educating the vendors on benefits such as improved cash flow and cash management. Whichever method to accelerate usage is chosen, it is a given that EDI invoices should be part of any reengineering effort.

Recommendation 6: Recommend that DFAS address the issue of the requirement to have a proper invoice from the contractor for payment under the contract for supplies delivered or services performed. Lessons learned from industry have sufficiently demonstrated that the invoice is a redundant step in the payment process. Industry has successfully demonstrated that contractor payments can be accurately made through receipt and acknowledgment reports.

Along this line, recommend that DFAS' EC program office and/or DLA's Emerging Technology IPPT do an in-depth study on the applicability of ERS to the DoD contracting environment. This study could include a pilot project, assessment of industry's use of ERS and assessment of other Federal agencies' attempts at eliminating the invoice. Determining

the feasibility of eliminating the need for an invoice could take many forms; however, the author believes this is a step that DoD should seriously consider.

Impediments to elimination of the invoice will include changing the performance metric DFAS uses for budget formulation and reimbursement from customer commands. Currently invoice processing is used as the metric for budget formulation and cost reimbursement. From the author's research, it would appear that processing of receiving reports could work as an alternative performance measurement. An additional impediment is the need to build long-term relationships with contractors. This could be attempted through the expansion of multi-year contracting, but would probably not comply with the intentions of the Competition in Contracting Act (CICA). Therefore, the challenge would be to make ERS work in DoD's current contracting environment.

Recommendation 7: Recommend DFAS take the lead in reengineering the procedures associated with the procurement card program. As industry experience has indicated, only the firms that reengineer their business practices reap all the benefits available from a procurement card program. The procedures associated with the credit card program that need to be addressed include re-engineering the reconciliation process and usage of the credit card as payment method.

The immediate problem that needs to be dealt with at DFAS is the shift in workload from invoice processing to reconciliation. As indicated in Chapter III, the procurement card has resulted in a reduction in the invoice processing workload at DFAS. However, reconciliation of the procurement card bank statement at the DFAS regional centers is a labor intensive, time-consuming task. It is recommended that DFAS attempt to get RMBCS to provide electronic bank statements via modem or disk. This information could then be reconciled by the user and sent in a format that can be directly loaded into DFAS' payment system. This would avoid all the manual re-keying. Another option is to require the user to use one, or a few, lines of accounting vice hundreds of different lines of accounting.

Expanding the use of the credit card as a payment method could improve the timeliness of payments to vendors as well as decrease the number of invoices sent to DFAS for payment. As noted by industry, this would entail a related increase in the dollar limit threshold. This is because to realize the benefits of procurement card purchasing, you need to be able to buy big ticket items with it. As industry representatives pointed out, this is because bigger ticket items give the vendor more profit to absorb the bank card transaction fee. In other words, the smaller the purchase the more potential

there is for the vendor to raise his price to cover the fee. Expanding the use of the credit card as a payment method could also have the added benefit of increasing competition. Because cash flow is so critical to business, this improved ability for businesses to get paid faster on large dollar contracts might make doing business with the government more attractive.

Recommendation 8: It is recommended that acquisition and deployment of SPS, DPPS and the associated SDW be completed as soon as possible. However, it is further recommended that the business process reengineering effort begun by the DPPS program office be completed prior to acquisition and deployment of DPPS. Unfortunately, the acquisition of SPS and the associated SDW is too far along to accomplish similar business process reengineering.

It is further recommended that the DPPS program office compile a system for collecting lessons learned from the SPS procurement. There is already DFAS representation in the SPS program office, so collection of this data should not be too difficult. Additionally, it is recommended that the DPPS program office send team members out to private industry to research several fully integrated procurement/payment systems to gather additional lessons learned. This could be done concurrently with the business process re-engineering. These

two functions, reengineering and benchmarking, will complement each other and tremendously benefit the program office.

Recommendation 9: Recommend that DoD increase communication with its vendor base in order to promote the benefits associated with EC/EDI. This can be accomplished by increasing availability of publications and educational materials, a consolidated Internet web site, a comprehensive TPA, and training sessions held by the ECRC's. One of the best messages DoD could promote is the fact that EC/EDI is the direction DoD is pursuing. A vendor should be encouraged to join now while they are one of a few, and there are people with plenty of time to help the vendor adjust. This would be vice waiting when there is a rush to sign up and the vendor is now one of many.

It is further recommended that DoD follow industry's lead and make EC/EDI mandatory for doing business with DoD. This may seem unfair to our contractors at first glance, but upon review would probably be good for them. If DoD can increase the efficiency with which it buys and pays for goods and services, more businesses are likely to participate and benefit. Additionally, by forcing businesses to get on the information technology bandwagon, we are making America more competitive in the global marketplace. Finally, there is

precedent for making EC/EDI mandatory with the recent enactment of the Electronic Funds Transfer (EFT) Expansion Act.

In recognition of the fact that DoD would probably be hesitant to mandate EC/EDI, it is recommended at minimum that DoD become more aggressive in marketing EC/EDI. The recent enactment of the EFT Expansion Act can be used as an example of the direction the Federal Government is taking concerning EC/EDI. Another marketing device is to take advantage of the shrinking DoD budget. Contractors know that competition for the shrinking budget will be tough and, therefore, should be encouraged to use EC/EDI to remain competitive. Additionally, the shrinking DoD budget is forcing contractors to look for more commercial work. EC/EDI should be marketed as one potential way of reducing administrative costs and increasing the competitiveness of the firm.

Recommendation 10: Recommend that the Prompt Payment Act be revised to allow DoD and its vendor base to take advantage of the efficiencies associated with the electronic payment process. This should allow DoD to negotiate lower costs for goods and services. This is based on the time value of money and the improved cash flow management.

Further, the ability to receive payment faster could be used as an enticement to get vendors to sign up for EC.

Studies of private industry have indicated that the other benefits associated with EC should be enticement enough for vendors to sign up for EC/EDI. However, the author feels that offering to pay vendors in less than 30 days would be a good incentive to get vendors to sign up for EFT/FEDI.

C. ANSWERS TO RESEARCH QUESTIONS

Primary Research Question: How is EFT/FEDI used in private industry and how can that information be used to facilitate a successful implementation of EFT/FEDI in the DoD contracting system? Although private industry has not completely signed up for EFT/FEDI use, the companies that have provide sufficient lessons learned to aid DoD in implementing EFT/FEDI. The Federal Government has now mandated the use of EFT to pay its vendors by 1 January 1999. Therefore, lessons learned from industry concerning EFT focused on marketing EFT to trading partners.

The more pertinent lessons learned from private industry concern implementation of FEDI. Although FEDI usage has been slow to take hold in private industry, several lessons learned from implementation can be used to facilitate DoD's implementation. These lessons learned are not restricted to the electronic payment mechanisms themselves, but address the entire spectrum of the electronic payment process. This is because the electronic payment mechanisms are well established

both in private industry and in DoD; however, the ability to pay contractors accurately is lagging. Thus, when applying lessons learned from private industry concerning FEDI use, the author concludes that DoD should concentrate on lessons learned with respect to reengineering the payment process before applying information technology.

Subsidiary Research Question 1. What is EFT/FEDI? EFT is the bank-to-bank exchange of electronic payment instructions while FEDI is the electronic exchange of payments, payment-related information, or financially related documents in standard formats between business partners. As noted in Chapter I, the author used the expanded version of the definition of FEDI to include any transaction that is associated with payment, such as invoice, remittance advice, and credit/debit memo.

Subsidiary Research Question 2. What is the current status of EFT/FEDI technology within the private sector acquisition and contracting system? EFT technology within the private sector acquisition and contracting system is well established. Most firms in private industry recognize the cost savings associated with EFT usage and have encouraged their suppliers to receive payments electronically. However, most still prefer to receive payments electronically vice pay electronically.

FEDI technology is still in the embryonic stage. More and more companies are signing up for the benefits associated with FEDI usage; however, the technology is proving more difficult than anticipated. Banks have been slow to sign up to provide FEDI services. Without EDI capable banks, FEDI growth will continue to be slow. However, recent advances in standards and formats, along with innovative procedures, have spurred growth in FEDI recently.

Subsidiary Research Question 3. What is the current status of EFT/FEDI technology with the DoD acquisition and contracting system? EFT technology is well established in DoD and is the preferred method for paying contractors. Additionally, in 1996 the EFT Expansion Act was passed making EFT mandatory for all Federal payments by 1 January 1999. Therefore, not only is the technology well established, the Federal Governments direction concerning EFT is set.

FEDI technology within the DoD acquisition and contracting system is established, but not widely used. DFAS has been using the 820 transaction set for years, but on a limited basis. DFAS is currently experimenting with new formats and methods of delivery. DoD appears committed to advancing the technology and increasing FEDI usage in the future.

Subsidiary Research Question 4. What problems have the private sector encountered during the implementation and operation of EFT/FEDI and how have these problems been resolved? The problems encountered by private industry during the implementation and operation of EFT/FEDI have been addressed throughout Chapters IV and V. The main problem, re-engineering the business process prior to applying information technology, was the hardest to overcome. Many industries spent years trying to reduce the steps involved in paying vendor invoices. However, the companies that invested this time found that their efforts paid significant dividends in increasing the efficiency of their payment process.

Another significant problem was dealing with the inherent fear of technology, both inside the company and out. Employees had to be convinced that reducing administrative costs would make the company more competitive and vendors had to be convinced to trust the technology associated with electronic payments. Additionally, the vendors had to be convinced of the savings associated with receiving electronic payments.

Subsidiary Research Question 5. Can private sector EFT/FEDI applications be utilized effectively and efficiently in DoD acquisition? The resounding answer to this question was an emphatic yes. Although the commercial and government

procurement environments differ, lessons learned from private industry still apply. This was demonstrated by the six step method for EFT/FEDI implementation delineated in Chapter IV. Additionally, the information technology applications found in private industry can be used by DoD. Some would require either modification of the application or modification of DoD policies and procedures. Either way, DoD would benefit tremendously from adopting these applications from private industry.

Subsidiary Research Question 6. What concerns regarding EFT/FEDI implementation exist at the Defense Finance and Accounting Service (DFAS) center and with DoD contractors? DFAS is currently concerned with its ability to sign up the thousands of vendors not yet using EFT by the 1 January 1999, deadline promulgated in the EFT Expansion Act. Policy is being formulated at DFAS headquarters to determine how to comply with this mandate. DFAS concerns about FEDI revolve around the lack of EDI capable vendors and banks. In order to make FEDI a reality, the numbers of EDI capable vendors and banks will have to dramatically increase.

DoD contractors' main concern about implementing EFT/FEDI revolves around the lack of remittance data. Remittance data was simple to receive and apply when it accompanied the paper check. However, now a contractor must have a good

understanding with its bank to ensure the remittance data is provided.

Subsidiary Research Question 7. What strategic issues must be resolved to achieve a successful implementation of EFT/FEDI in DoD's contracting system? The main strategic issue DoD must contend with is whether or not to make EFT/FEDI use mandatory for DoD contractors. With the enactment of the EFT Expansion Act, the Federal Government made the decision to make EFT mandatory. Now DoD must decide whether or not to make EC/EDI mandatory in order to capatilize on the benefits associated with FEDI.

D. AREAS FOR FURTHER RESEARCH

The following are suggested topics for further research in the electronic payment process area:

- Perform a cost benefit analysis to determine the feasibility of privatizing the payment process.
- Develop a flow chart delineating the current steps associated with DFAS' payment process.
- Conduct research on the acquisition and deployment of the DPPS.
- Conduct research on the acquisition and deployment of the SPS.
- Perform a case study of the VA's highly successful implementation of EC.

APPENDIX A

LIST OF ABBREVIATIONS

ACH	Automated Clearing House
ANSI	American National Standards Institute
ASC	Accredited Standards Committee
CAGE	Commercial and Government Entity
CAS	Contract Administrative Services, DFAS-Columbus Center
CCD+	Cash, Concentration, and Disbursement (EFT format)
CIM	Corporate Information Management
CLIN	Contract Line Item Number
COTS	Commercial Off The Shelf
CTP	Corporate Trade Payment (EFT format)
CTX	Corporate Trade Exchange (EFT format)
DCAA	Defense Contract Audit Agency
DCMC	Defense Contract Management Command
DFARS	DoD Federal Acquisition Regulation Supplement
DFAS	Defense Finance and Accounting Service
DISA	Data Interchange Standards Association, Inc.
DLA	Defense Logistics Agency
DMRD	Defense Management Review Decision
DoD	Department of Defense

DPPS	Defense Procurement Payment System
EC	Electronic Commerce
EDI	Electronic Data Interchange
EDIFACT	Electronic Data Interchange for Administration, Commerce and Transportation
EFT	Electronic Funds Transfer
E-Mail	Electronic mail
FACNET	Federal Acquisition Computer Network
FAR	Federal Acquisition Regulation
FAX	Facsimile
FEDI	Financial Electronic Data Interchange
FMS	Financial Management Service (U.S. Treasury)
FRS	Federal Reserve System
FRS	Financial Reporting System (U.S. Navy)
FY	Fiscal Year
GSA	General Services Administration
IC	Implementing Convention
MNS	Mission Need Statement
MOCAS	Mechanization of Contract Administrative Services
NACHA	National Automated Clearing House Association
NPR	National Performance Review
OSD	Office of the Secretary of Defense
PMO	Program Management Office

RMBCS	Rocky Mountain Bankcard System, Inc.
SEPS	Standard Electronic Processing System
SPS	Standard Procurement System
STARS	Standard Accounting and Reporting System (U.S. Navy)
TPA	Trading Partner Agreement
VAB	Value-Added Bank
VAN	Value-Added Network
X12	American National Standards Institute Subcommittee for EDI

LIST OF REFERENCES

1. Deputy Under Secretary of Defense (Acquisition Reform), "DoD Electronic Commerce (EC)/Electronic Data Interchange (EDI) in Contracting Report," Washington, D.C., 20 December 1993.

2. Deputy Under Secretary of Defense (Acquisition Reform), "Your Introduction to Electronic Commerce: A Handbook for Business," Washington, D.C., 1995.

3. Barnard, James W., "Implementation of Electronic Data Interchange (EDI) at the Defense Fuels Supply Center (DFSC)," Masters Thesis, Naval Postgraduate School, Monterey, California, December 1995.

4. "The Why EDI Guide for Small and Medium-sized Enterprises," *EDI World Institute*, Montreal, Canada, 1995.

5. Ferguson, D.M. and Hill, N.C., "Introduction to EFT and Financial EDI," *EDI Forum*, v.5, n.3, pp12-19.

6. Falconer, Theresa, "Selecting Financial EDI Service Providers," *TMA Journal*, January/February 1995.

7. Federal Electronic Commerce Acquisition Team, "Streamlining Procurement Through Electronic Commerce," Falls Church, VA, 13 October 1994.

8. Taft, W.H., "Electronic Data Interchange of Business-Related Transactions," Deputy Secretary of Defense Memorandum, Washington, D.C., 24 May 1988.

9. Department of Defense, *Strategic Plan for Electronic Data Interchange*, Naval Supply Systems Command, Washington, D.C., November 1991.

10. Turner, Robert B., "Implementation of Electronic Data Interchange in the Department of Defense: Lessons Learned From Private Industry," Masters Thesis, Naval Postgraduate School, Monterey, California, June 1993.

11. National Performance review, *From Red Tape to Results: Creating a Government that Works Better and Costs Less*, Report of the National Performance Review, Washington, D.C., September 1993.

12. Benson, James, "Electronic Commerce: Reengineering in Real Time," National Contract Management Association, Topical Issues In Procurement Series, Vienna, VA, April 1995.

13. Public Law 104-106, Fiscal Year 1996 Defense Authorization Act, Government Printing Office, Washington, D.C., February 10, 1996.

14. Murphy, D.R., "Electronic Commerce: The Way the Federal Government Will Do Business," National Contract Management Association, Topical Issues In Procurement Series, Vienna, VA, July 1994.

15. Smith, Eric,"An Introduction to EDI," *EDInfo*, v.1, n.1, pp2-3, March 1992.

16. Data Interchange Standards Association, "An Introduction to Electronic Data Interchange," Alexandria, VA, 1990.

17. Regulation E, Electronic Fund Transfers, 12 Code of Federal Regulations (CFR) 205.

18. Smith, Daniel J., "Electronic Payments in DoD Contracting," Masters Thesis, Naval Postgraduate School, Monterey, California, June 1993.

19. Klawitter, Susan M., "Electronic Payments: Another Role for Banks," *EDI World*, v.2, n.10, October 1992.

20. Gregory, T.A., "Just What is a VAB?," *EDI World*, v.3, n.2, February 1993.

21. Dickerson, Francis, "Financial EDI Pays Off," *Trends Magazine*, April 1994.

22. Wheatman, Victor S., "Financial EDI: Getting from Here to There," *Northern California EDI Users Group Newsletter*, 1995.

23. Manypenny, G.D., and Bermudez, M.L., "The Federal Reserve Banks as Fiscal Agents and Depositories of the United States," *Federal Reserve Bulletin*, v.78, n.10, October 1992.

24. Board of Governors of the Federal Reserve System, "The Federal Reserve in the Payments System," *Federal Reserve Bulletin*, v.76, n.5, May 1990.

25. 1993 ACH Rules, "A Complete Guide to Rules & Regulations Governing the ACH Network," National Automated Clearing House Association, 1993.

26. Summers, B.J., "Clearing and Payment Systems: The Role of the Central Bank," *Federal Reserve Bulletin*, v.77, n.2, February 1991.

27. National Commission on Electronic Fund Transfers, "EFT in the United States: Policy Recommendations and the Public Interest," 28 October 1977.

28. Logistics Management Institute Report DL001-02R1, "An Electronic Commerce Program for the Defense Finance and Accounting Service - Columbus Center," by T. Hardcastle and W. Ledder, May 1991.

29. Defense Finance and Accounting Service-Columbus Center, "Contractor Payment Information," DFAS-Columbus Center, Columbus, Ohio, 1992.

30. DFAS-Columbus Center, MOCAS Contract Operations Training Index, Phase II, Segment IX.

31. EDI Integration Corporation (EIC), "STARS (SEPS) EDI/EFT Expansion Program Master Plan," April 1992.

32. DFAS-Cleveland, "SEPS: Standard Accounting and Reporting System (STARS) Electronic Processing System (SEPS) Briefing."

33. Brown, G., "Standard Operating Procedures, Electronic Funds Transfer MOCAS Financial System," DFAS-Columbus Center, 29 November 1990.

34. Federal Acquisition Regulations (FAR), Commerce Clearing House, 1 January 1996.

35. Rhoads, Christy, "Defense Procurement Payment System; Mission Need Statement," Defense Procurement Payment System Program Management Office, September 1995.

36. Defense Procurement CIM Systems Center, "Department of Defense Standard Procurement System: Mission Need Statement," Defense Procurement CIM Systems Center Program Management Office, 3 April, 1995.

37. Office of Management and Budget, "Payments by Electronic Funds Transfer," OMB Bulletin No. 94-09, Washington, D.C., 15 August, 1994.

38. Cancian, Mark, "Acquisition Reform: It's Not As Easy As It Seems," *Acquisition Review Quarterly,* Summer 1995.

39. Fox, J. Ronald, "Arming America," Cambridge: Harvard University Press, 1974.

40. Bernazzani, Judith P., and Steer, Lesley M., "An Introduction to the ISO 9000 Series: Quality Standards," National Contract Management Association, Topical Issues in Procurement Series, Vienna, VA, June 1995.

41. Schaap, Alexander, "Evaluated Receipts Settlement in the Automotive Industry," *EDI Forum*, v.5, n.3, pp36-39.

42. Oravec, Jim, "I'm From Corporate...and I'm Here to Help!," *Northern California EDI Users Group Newsletter*, v.4, n.2, March/April 1995.

43. "Re-engineering the Payment Process Using EDI, ERS and Imaging Technology," *Journal of Cash Management*, v.13, n.5, September/October 1993.

44. Forster, Michael H., "A Data Warehousing Success Story: Advocate Health Care Bucks the Competition," *Sybase Warehouse WORKS*, Sybase Information Connect Division, 1995.

45. O'Malley, Jim, Financial EDI Manager for Motorola Land Mobile Products Sector (LMPS), interview granted 21 May 1996.

46. Lang, Scott, National Automated Clearing House Association, Director of Wholesale Applications, interview granted 22 May 1996.

47. Hinton, Brian D., and Tillesen, Scott R., "EDIBANX: Using EDI to Enhance Credit Management," *Business Credit*, January 1996.

48. Shrigley, Regina, Defense Finance and Accounting Service-Columbus Center, Electronic Funds Transfer Office, interview granted 6 May 1996.

49. Lang, Scott, "ACH Statistics Fact Sheet," National Automated Clearing House Association, Herndon, VA, 22 May 1996.

50. Bowman, Keith, Electronic Commerce Program Office, Defense Finance and Accounting Service Headquarters Office, Washington, D.C., interview granted 6 May 1996.

51. Data Interchange Standards Association, "Seven Trends in Treasury Management: Banks Find New Ways to Hook Businesses on EDI," DISA EC/EDI sessions, 1996.

52. Cohn, Morris, TRW Accounts Receivable/Accounts Payable Division, interview granted 15 May 1996.

53. Anderson, James, "Eye to Eye with Electronic Commerce," An Address to Acquisition and Contract Management Students of the Naval Postgraduate School and the NPS Chapter of NCMA, 19 April 1996.

54. Keevey, Richard F.,"1996 DFAS Strategic Plan," Defense Finance and Accounting Service, 8 April 1996.

55. Hagedorn, Jim, "Most Federal Checks Replaced by New Law," Department of the Treasury, Financial Management Services News Release, 13 May 1996.

56. Burgmeyer, Bill, Customer Service Office, Defense Finance and Accounting Service Headquarters Office, Washington, D.C., interview granted 28 May 1996.

57. Hearing Before a Subcommittee of the Committee on Government Operations, House of Representatives, Ninety-ninth Congress, Second Session, July 29, 1986, U.S. Government Printing Office, Washington, D.C.

58. Slater, Richard S., "An Analysis of Credit Card use as a Method for Making Small Purchases in the United States Marine Corps," Masters Thesis, Naval Postgraduate School, Monterey, California, December 1994.

59. "Management: Involvement by General Managers in Information Technology Issues is Lacking," *Government Executive*, Information Technology Guide, April 1996.

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